PROCEEDINGS

OF THE

Bournemouth Natural Science Society.

VOL. XXI.

SESSION 1928-29.

BRITISH MUSEUM
NATURAL HISTORY

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BRITISH MUSEUM
NATURAL HISTORY

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Introductory Note.

THE Bournemouth Natural Science Society was founded in 1903, being the successor to an older society which was formed in 1883 and dissolved in 1897. The early meetings of the Society were held in a room hired from time to time for the purpose, but the need of some fixed quarters was soon felt. To meet this need a small room was taken at 122 Old Christchurch Road, and, as this proved inadequate, in February, 1909, better accommodation was secured at Granville Chambers and retained for four years. In March, 1913, the Society took on lease from the Education Committee a large room on the ground floor of the Municipal College. In 1919 this also had to be given up, and the Society succeeded in acquiring a house of its own, 39 Christchurch Road. The formal opening was on February 7, 1920. In 1929 a Lecture Hall was added, and the ground floor of the old building reconstructed. The work was completed and the New Hall inaugurated on October 14, 1929.

The objects of the Society are declared by the second of its rules to be " the promotion of the study of Science in all its branches, by means of Lectures, Field Meetings, the Reading and Discussion of Papers, and the formation of Sections of its members devoted to any particular branch of the Society's work, and in any way that the Council of the Society shall deem advisable."

The Sections at present working are as follows:— **Archæological and Historical, Astronomical, Botanical, Entomological, Geographical, Geological, Microscopical, Photographic and Record, Physical, and Zoological.**

During the WINTER SESSION, from October to April, GENERAL and SECTIONAL MEETINGS are held, comprising Lectures and Demonstrations on subjects of scientific interest, illustrated by lantern slides, diagrams, specimens or experiments.

All meetings are open to all members of the Society.

Throughout the SUMMER SESSION, EXCURSIONS to places of interest in the neighbourhood are arranged and indoor or garden meetings occasionally held.

The management of the Society is vested in a Council, which is elected at the Annual General Meeting, held in October.

The Society possesses a Library available for the use of members. This is yearly becoming more extensive and valuable by the acquisition of standard text books and of books dealing with matters of local scientific interest. Books may, under certain conditions, be borrowed by members, and there is a Reading Room in which works of reference may be consulted.

The Society's collections of archæological, botanical, geological, zoological and other specimens are now arranged in the MUSEUM. Articles on the collections were contributed to Vols. V. X. and XVII. of the Proceedings by Sir Daniel Morris, Mr. W. G. Wallace and Rev. C. O. S. Hatton respectively.

Members are elected by the Council and pay an annual subscription of £1 for full membership (admitting to all meetings and excursions for the year), a subscription of £2 covers four adult members of the same family residing in the same house.

A MONTHLY NOTICE, giving full details of all meetings, etc., is posted to every member before the beginning of each month, and a volume of Proceedings is published every year.

Application Forms for Membership, and further particulars, can be obtained from the

HON. SECRETARY,

Bournemouth Natural Science Society.
39 Christchurch Road,
Bournemouth.

Bournemouth Natural Science Society.

OFFICERS AND COUNCIL FOR 1928-29.

President

CLAUDE LYON.

Vice-Presidents

HENRY BACKHOUSE, F.R.H.S.
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REV. C. O. S. HATTON, B.A., F.L.S.
SIR DANIEL MORRIS, K.C.M.G., J.P., M.A., D.SC., D.C.L., LL.D., F.L.S.
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R. V. SHERRING, F.L.S.
HEYWOOD SUMNER, F.S.A.

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REV. C. O. S. HATTON, B.A., F.L.S.

Deputy-Chairman of Council

CLAUDE LYON.

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Botanical: L. BEECHING HALL, F.L.S.
Entomological: HOWARD LACEY, B.A.
Geographical: CLAUDE LYON.
Geological: HENRY BURY, M.A., F.L.S., F.G.S.
Microscopical: F. B. TAYLOR, B.A.
Photographical and Record: W. DIESELHORST, A.M.I.C.E.
Physical: G. E. J. CRALLAN, M.A., M.B., M.R.C.S.
Zoological: F. G. PENROSE, M.D., F.R.C.P., F.Z.S., M.B.O.U.

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G. BRUMELL, A.R.I.B.A., Maori, 15 Richmond Park Avenue.

Secretaries

Hon. Secretary: REV. A. G. YATES, M.A., R.N., 14 Wellington Road. to whom all official correspondence should be addressed.

Hon. Assistant Secretary: W. J. WOODHOUSE, A.C.P., M.I.H., 35 Chatsworth Road.

Assistant Secretary: J. F. SPENCER, Glenthorne, Richmond Park Road.

Hon. Librarian

CLAUDE LYON, Shalimar, Wilderton Road.

Hon. Editor

J. R. WHITE, M.A., Whitecot, Linwood Road.

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E. BICKER & SON. F. BROAD.

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NATIONAL PROVINCIAL BANK OF ENGLAND, BOURNEMOUTH.

List of Members.

Revised to 4th November, 1929.

* Honorary Members. † Past Presidents. o Original Members.
G Morris Gold Medallist. A Associate Members.
The year of election is given before the name of each member.

A

1928	Abernethy, Mrs.	4 Branksome Gate, Branksome Park
1928	AAdcock, Miss M. D., B.Sc.	Newbold Verdun, Orchard Avenue, Parkstone
1927	Adkins, H.	Glenavon, 107 Alumhurst Road
1924	Amos, Miss E.	Langley Dene, 55 Wellington Road
1920	Anderson, Col. E. B., C.B.E.	Woodmanton, 35 Wellington Road
1922	Anderson, Col. R. F.	Glenalmond, 5 Madeira Road
1923	Anderson, Mrs.	,, ,, ,,
1923	Anderson, Mrs. M.	Ranfurly, 18 Dean Park Road
1914	Andrews, W.	Brownlea, Berkeley Road
1911	Atkins, Mrs.	10 Fortescue Road
1924	Attwell, A. F., M.P.S.	17 Hamilton Road
1926	Audain, Mrs. N. M.	1 Durrant Villas, Avenue Road

B

1906	Backhouse, H., F.R.H.S.	Sundridge, Grove Road
1929	Balfour, Col. J. H.	The Brown House, Ferndown
1928	Ball, Miss J. E.	Restawhile, Whitecliff Road, Parkstone
1927	Ball, W. T., O.B.E.	7 Portman Crescent
1929	Barker, H.	Mossgiel, King's Avenue, Parkstone
1929	Barker, Miss F. E.	,, ,, ,,
1929	Barker, Miss J. D.	,, ,, ,,
1922	Barker, S.	66 West Cliff Road
1921	Barker, Miss W.	,, ,,
1905	Barlow, E. W., B.Sc., F.R.A.S., F.R. MET. S.	Greengates, Wadhurst, Sussex
1912	ABarraclough, A., M.A., F.R.G.S.	173 Richmond Park Road
1909	Barratt, J. Hayes	Brundon, 2 Surrey Road
1924	Barratt, Mrs.	,, ,,
1924	Barratt, Miss P. M.	,, ,,
1905	Bartlett, H. F. D., F.E.S.	Island of St. Helena, South Atlantic
1920	Bartlett, P. R.	35 King's Park Road
1927	Bater, G. W., B.A.	22 Dingle Road
1927	Bater, Mrs.	,, ,,
1927	Bater, Miss K. J.	,, ,,
1928	Beale, J. Bennett	Sunnycourt, Glenferness Avenue
1918	Beale, Mrs.	,, ,,
1928	Beale, Miss E. E.	,, ,,
1928	Beaumont, Miss E. G.	Cranfield, Mansfield Road, Parkstone
1929	ABeer, Miss G. A.	Marchwood, Princess Road
1923	Bell, Major J. G.	Ivanhoe, Sandringham Road, Parkstone
1923	Benest, Mrs. A. S.	Tijuca, 54 Wellington Road
1904	Bennett, H. Morden	Sweet Briar, 12 Derby Road
1920	Bennett, Risdon, M.A.	Yew Tree Cottage, Broadstone
1921	Bevan, Trevor	17 Stirling Road

1923	Bishop, E.	21 Surrey Road
1912	Blackall, Miss E. E.	10 Harcourt Road, Boscombe Park
1928	Blake, Mrs. E. M.	18 Bodorgan Rood
1928	Bolitho, Mrs.	11 Portarlington Road
1910	*Bond, F. Bligh, F.R.I.B.A.	454 Gloucester Road, Bristol
1920	Borrett, Surgeon-Capt. G. G., R.N.	62 Alum Chine Road
1924	Borrett, Mrs.	,, ,,
1925	Borrow, Frederick	The Knoll, Charminster Road
1925	Borrow, Mrs.	,, ,,
1924	Bottomley, Miss O.	Langley Dene, 55 Wellington Road
1929	Bourdass, Miss A.	7 Beaulieu Road
1929	Bourdass, Miss F.	,, ,,
1920	ABourne, Miss C. M.	56 Sunny Hill Road, West Southbourne
1927	Boyt, Miss J.	1 Ascham Road
1914	Bradbury, Miss E.	La Bocca, 2 Portarlington Road
1925	Bradley, F. L.	Holmwood, 12 Chine Crescent Road
1924	Bragg, Miss H. B.	4 Chester Road
1924	Bragg, Miss R.	,, ,,
1924	Bragg, Miss S. B.	,, ,,
1922	Brewitt-Taylor, Mrs. Ray	10 Forest Road, Branksome Park
1926	Broad, F.	Manton Villa, 2 Oxford Road
1928	Broad, Mrs.	,, ,,
1921	Bromley, Miss	81 Lansdowne Road
1917	Brown, Edward	West Ridge, Chessel Avenue
1917	Brown, Mrs.	,, ,,
1924	Brown, Miss E.	Chobham House, 4 St. Winifred's Road
1924	Brown, Miss E. S.	,, ,, ,,
1924	Brown, Miss F.	,, ,, ,,
1926	Brown, Lt.-Col. F. Tatton	Talbot Hurst, 3 Branksome Hill Road
1929	Brown, Miss H. E.	87 Wentworth Avenue
1923	Browne, John	Serantes, Glen Road, Boscombe
1924	Browning, Miss E. M.	Littleholm, Ferndown
1905	Brumell, G., A.R.I.B.A.	Maori, 15 Richmond Park Avenue
1920	Brumell, Mrs.	,, ,, ,,
1929	Brumell, Miss H. M.	,, ,, ,,
1920	Brumell, Miss M.	,, ,, ,,
1920	Bryant, Miss M.	Sunnyhill, Hampden Lane, W. Southbourne
1929	Buckingham, H.	6 Bodorgan Road
1907	Bulfin, Ignatius, B.A.	The Den, 26 Knole Road
1908	Bulfin, Mrs.	,, ,,
1929	Bunce, Miss A. M.	32 Alum Chine Road
1929	Burge, J. T.	Glenhurst, Braeside Road, West Moors
1924	Burgess, J.	Kempston, Chine Crescent Road
1927	Burrell, Mrs. A. E.	Freydan Lodge, Poole Road
1924	Burroughs, F. G.	63 Maxwell Road
1919	Burstal, E., M.D.	46 Lansdowne Road
1926	Burstal, E. K., M.I.C.E.	27a Grove Road
1926	Burstal, Mrs.	,, ,,
1922	Burton, E. St. John, F.L.S., F.G.S., F.Z.S.	Melville, 4 Howard Road
1927	Burton, Stewart	Dunmere, 17 Eaton Road
1922	Bury, Henry, M.A., F.L.S., F.G.S.	The Gate House, 17 Alumdale Road

C

1928	ACalkin, J. B., M.A.	Wychwood School
1924	Campbell, Mrs.	Whingate, Broadstone
1919	Cardew, R. K., B.A.	Stafford Lodge, 26 Dean Park Road
1920	Cardew, Mrs.	,, ,, ,,

1929	Carle, J.	Jedburgh, 39 Namu Road, Winton
1912	Carus-Wilson, C., J.P., F.R.S. (Edin.), F.G.S.	Altmore, Waldegrave Park, Strawberry Hill, Middlesex, and Royal Societies' Club, S.W.
1927	Castell, Mrs.	62 Wellington Road
1925	Chilver, Mrs. E. K.	2 Shaftesbury Road
1912	aChilver, Miss K. M.	,, ,,
1927	Christy, R. W.	Greyfriars, Ringwood
1926	Clare, Mrs.	48 Queen's Park West Drive
1929	Clarke, Mrs. T.	26 Bodorgan Road
1929	Clarke, Mrs. V. M.	16 Woodland Avenue
1927	*Clay, R. C. C., M.D., F.S.A.	The Manor House, Fovant, Wilts
1908	Coddington, E. F.	34 Irving Road
1929	Colledge, T.	3 Watkin Road, Boscombe
1929	Collen, Miss J.	7 Meyrick Road
1911	Collins, W. F.	Vellore, Overcliff Drive
1928	Connah, J., B.SC., F.I.C.	Deva Cottage, Braidley Glen
1928	Constantine, M. H.	Brendon, Nairn Road
1929	Cooke, A. C., O.B.E.	19a Knyveton Road
1929	Cooke, Miss I. D.	,, ,,
1927	Cookes, C. E.	145 Southcote Road
1912	Cooper, Ernest	100 Old Christchurch Road
1926	Cooper, H. A.	25 Talbot Avenue.
1926	Cooper, Mrs.	,, ,,
1926	Cooper, A. H.	,, ,,
1926	Cooper, Miss S. I.	,, ,,
1926	Cooper, J. S.	The Little Red House, Colehill, Wimborne
1903†	oCrallan, G. E. J., M.A., M.B., M.R.C.S.	St. Cross, 13 Bodorgan Road
1922	Crallan, Mrs.	,, ,,
1920	Cressy, Miss H.	Bramcote, 1 Glen Road, Boscombe
1927	Cripps, C. Couper, M.D., M.R.C.S.	14 Dean Park Road
1927	Cripps, Mrs.	,, ,,
1922	Crowther, Miss V.	Berwyn Bank, Poulner Hill, Ringwood
1922	Curme, Miss M. E.	65 Lansdowne Road
1928	Curtis, E. A., L.D.S.	Holm Dene, Poole Road
1928	Curtis, Mrs.	,, ,,
1928	Curtis, E. J. B., L.D.S.	,, ,,
1903	oCurtis, W. Parkinson, F.E.S.	Drake North, Sandringham Road, Parkstone
1922	*Elected an Honorary member	

D

1927	Dacombe, J. M. J.	27 Holdenhurst Road
1920	Darke, Miss W. E.	25 Hawkwood Road, Boscombe
1928	aDavidson, Miss M. S., M.A., B.SC.	2 Cecil Hill
1921	aDavies, Miss H. V., B.SC.	Municipal College
1919	Davison, Miss L.	15 Dean Park Road
1929	Dawson, Miss L. N.	20 Carbery Avenue
1924	Deas, J., M.A., I.C.S.	57 Wellington Road
1926	de Paiva, Miss E.	Sunny Halt, Hamilton Road, Boscombe
1914	Dickson, Col. W. D., J.P.	Southill, 32 Dean Park Road
1914	Dickson, Mrs.	,, ,,
1919	Dieselhorst, W., A.M.I.C.E.	50 Surrey Road
1924	Dieselhorst, Mrs.	,, ,,
1903o	*Dixon, J. R. L., M.R.C.S., L.R.C.P.	
1920	Dodd, Col. J. R., M.D., F.R.C.S.	140 Richmond Park Road
1921	Dodd, Mrs.	,, ,,
1921	Dodd, T. A.	,, ,,

1928	Dodds, H.	19 Foxholes Road, Southbourne
1910	Dodshon, E., LL.B.	126 Old Christchurch Road
1926	Dodwell, Mrs. L. B.	Crendon, Carbery Avenue, West Southbourne
1928	Drew, Lt.-Col. C. D., D.S.O., F.S.A.	Dudsbury House, Longham, Wimborne
1929	Drew, R. C.	66 Wimborne Road
1929	Drew, Mrs. C. M.	,, ,,
1929	Drew, R. E. I.	,, ,,
1923	Druitt, Alan, F.E.S.	Willow Lodge, Mudeford, Christchurch
1923	Druitt, Mrs.	,, ,, ,, ,,
1925	Druitt, Miss C. M.	99 Lowther Road
1925	Druitt, Miss C. S.	,, ,,
1928	Dundee, Col. W. J.	38 Portchester Road
1926	Dundee, Mrs.	,, ,,
1921	Dunn-Gardner, R. C.	24 Queensberry Place, S. Kensington, S.W.7
1929	Dunphy, V.	9 Manor Road

E

1924	Edwards, Miss M. J.	Aysgarth, 16 Poole Road
1929	Eldridge, Mrs. H.	L'Incontro, 9 Penn Hill Avenue
1923	Ellen, Miss D. M.	Staunton, Exeter Park
1922	Ellis, Mrs.	10 Forest Road, Branksome Park
1922	Ellis, Miss W. M.	,, ,, ,, ,,
1923	Elrington, R.	Mavis Bank, 15 Bodorgan Road
1923	Elrington, Mrs.	,, ,,
1922	Elwes, Mrs.	Burnt Hill, Broadstone, Dorset
1924	Ensor, Mrs.	26 Frederica Road, Winton
1909	Evans, P. H. L., M.A.	Stirling House, 28 Manor Road
1927	Exon, C., M.A.	Aldermoor, Douglas Road, Southbourne

F

1920	Fairbrother, Miss L.	4 Golf Bungalows, Hindhead, Surrey
1921	Fane, F. L.	Haldon, Spur Hill Avenue, Parkstone
1921	Farmar, Miss D. A.	Dorset Lodge, 10 Suffolk Road
1919	Farmar, Mrs. K. A.	Whitton Lodge, Stevenson Crescent, Parkstone
1922	Farmar, Miss E. A.	,, ,, ,, ,,
1929	Fell, Mrs. Henry	9 Branksome Wood Road
1914	Fielding, T., M.D.	Genesta, West Hill Road
1927	Finlinson, F. J.	Daneshill, Queen's Park Avenue
1927	Finlinson, Miss D. C.	,, ,, ,,
1903	Firbank, Miss, LL.A., A.C.P.	5 Buchanan Avenue
1929	Fitzgerald, Miss G. P.	10 St. James' Square, Boscombe
1922	Fonblanque, Miss Ida	4 Gordon Road
1928	Formoy, J. A., F.R.A.S., F.C.S.	Linkfield Court, Knyveton Road
1917	Forrest, Mrs.	The Cottage, Benellen Towers, Branksome Wood Road
1925	Fountain, E. D., L.R.C.P., M.R.C.S.	Vron, 30 Mansfield Road, Parkstone
1925	Fountain, Mrs.	,, ,, ,, ,,
1922	Fowler, A. R. W., B.A.	St. Ina, Beechwood Avenue
1922	Fowler, Mrs.	,, ,, ,,
1919	Fowler, Miss M. L.	Lerryn, Chessel Avenue
1924	Freer, Miss L. W.	1 Branksome Park Avenue
1927	French, F. W.	1 Ascham Road
1927	French, Miss J. E.	,, ,,
1909	French, J. M.	Jumpers House, Christchurch
1923	Fryer, Miss C. H.	Moulton, 46 Wellington Road
1928	Fryer, Miss G. M.	4 Milton Road

1928	Fulcher, L. W., B.SC.	60 Herberton Road
1928	Fulcher, Mrs.	,, ,,

G

1929	Gallaher, Miss M.	60 Surrey Road
1922	Gardiner, Miss F. M.	3 Adeline Road, Boscombe
1926	Gardiner, H. L.	,, ,,
1922	Gatty, Lady K.	Ossemsley Manor, Christchurch
1922	Gatty, Miss H.	,, ,,
1922	Gatty, Oliver	,, ,,
1922	Gatty, Richard	,, ,,
1924	George, Miss M.	3 Balmoral, West Hill Road
1923	Gibbs, F. L. A.	Hawthorns Hotel, West Cliff Road
1921	Gibbs, G. F.	Fairview, 13 Herbert Road
1925	Gill, Miss Ida	Rosslyn, Seldown, Poole
1922	Gill, Major W. R.	Chewton Lodge, Highcliffe
1923	Gill, Mrs.	,, ,, ,,
1924	Goddard, Rev. C. V.	62 Parkwood Road, Boscombe
1925	Goodacre, Rev. C. B.	3 Cecil Road, Boscombe
1929	Goodacre, W., F.R.A.S.	Waratah, Leicester Road
1924	Goode, Mrs.	50 Surrey Road
1927	Gorton, B., M.R.C.V.S., M.P.S.	22 Arnewood Road
1921	Gosse, W., M.D., D.P.H.	Langley, Rowlands, Wimborne
1929	Graves, Basil, M.C., M.A., M.R.C.S., L.R.C.P.	13 Wimborne Road
1929	Graves, Mrs.	,, ,,
1904	Gray, Arthur	Woodville, 26 Melville Road, Winton
1911	Gray, Mrs.	Darena, 15 Wellington Road
1914	Greves, E. Hyla, M.D., F.R.C.P.	Rodney House, 19 Poole Road
1914	Greves, S. S. Hyla	,, ,,
1917	Grindley, Miss E. J.	Milnthorpe, Rossmore Avenue, Parkstone
1929	Gurney, Miss A.	20 Carbery Avenue

H

1923	Haigh, A. E.	Exhall, 20 Christchurch Road
1929	Haigh, W. R.	32 Beaufort Road
1929	Haines, G. E.	602 Christchurch Road
1924	Hall, L. Beeching, F.L.S.	Lingdene, King's Avenue, Parkstone
1929	Hall, R. Radclyffe	31 R. L. Stevenson Avenue
1929	Hall, Mrs.	,, ,,
1929	Hallowes, G. P. B., F.R.A.S.	The Sheiling, Colehill, Wimborne
1921	Hardwick, S.	51 Poole Hill
1913	Harris, Miss K.	Trescott Grange, Harvey Road, Boscombe
1912	Harrison, Henry	Eden Lodge, 7 Surrey Road South
1927	Harrison, Miss J. D.	13 Beresford Road
1926	Harrison, Miss M. P.	Hinton Vicarage, Christchurch
1929	Harrison, Miss N. B.	64 Parkwood Road
1914	Hartley, Dr. J.	62 Portchester Road
1914	Hartley, Mrs.	,, ,,
1922	Hartley, J. A.	,, ,,
1927	Hartree, D. G.	197 Holdenhurst Road
1927	Hartree, Miss B. M.	,, ,,
1914	Hatton, Rev. C. O. S., B.A., F.L.S.	Hinton Vicarage, Christchurch
1921	*Elected an Honorary Member	
1920	Hawes, Miss	The Moorings, 27 Nelson Road
1924	Hawley, Miss H. M.	Galloway Lodge, 27 Florence Road, Boscombe

1917	Haydon, C. J.	Ben Veula, 29 West Cliff Road
1923	Hayman, Mrs.	Thorncliffe, Queen's Park South Drive
1918	Haythorne, E. C. C.	Forest Lodge, Burton Road, Branksome Park
1921	Hellyar, Miss E. F.	Cerne Abbas, 1 Belvedere Road
1921	Hellyar, Miss M. F.	,, ,,
1923	Hellyar, Miss M. R.	,, ,,
1917	Henderson, Miss A. J.	Springbank, 22 Fox Road, Greenock
1927	Henderson, F. W., L.R.C.S.I., L.K.Q.C.P.I.	4 The Tankerville, Owls Road, Boscombe
1928	Henderson, Major H. E.	Tall Trees, Wayside Road, Southbourne
1928	Henderson, R. G., M.A., M.B., Ch.B. (Aber.), F.R.C.S. (Edin.)	87a Southbourne Road
1921	Heymann, B. M.	Greencroft, Alyth Road, Talbot Woods
1921	Heymann, Mrs.	,, ,, ,,
1923	Hill, C. S.	Northfield, Chigwell Road
1928	Hill, Miss E. C.	The Homestead, 29 St. John's Road, Boscombe
1924	Hoare, Miss E.	7 Cambridge Road
1928	Hobbs, Mrs. J. A.	Chingri Khal, Queen's Park Avenue
1928	Hobbs, Miss D. M.	,, ,, ,,
1922	Holdom, Mrs. E.	Cranfield, Mansfield Road, Parkstone
1909	Holmes, Mrs.	Brackenwood, 37 Southern Road, West Southbourne
1911	Holmes, Miss S. C. M.	c/o National Provincial Bank, Southbourne Grove
1911	Homer, L. V. C.	Carron, 54 Southcote Road
1929	Hooper, Miss M. N.	Southland, Corfe Castle
1928	Horne, Rev. E. H., M.A.	64 Alum Chine Road
1920	Horne, Miss J.	Ayton House, West Cliff Road
1929	Houghton, Miss J.	20 St. Anthony's Road
1928	Howard, A. F.	Hawthorns Hotel, West Cliff
1924	Howell, W. Rees	Cintra, 35a Richmond Wood Road
1923	Howell, Mrs. Rees	,, ,, ,,
1911	Hudson, F.	Penarol, Parkstone
1911	Hudson, Mrs.	,, ,,
1925	Humby, H. G.	Brackendene, 23 Wimborne Road
1925	Humby, Mrs.	,, ,,
1929	Humphrys, Dr. C. B.	29 Wellington Road
1929	Humphrys, Mrs.	,, ,,
1927	Hunt, Mrs. F.	33 Stirling Road
1926	Hurry, J. B., M.A., M.D., J.P.	Hinton Firs, 9 Manor Road
1926	Hurry, Mrs. G. L.	,, ,, ,,
1926	Hurry, A. G, M.A.	,, ,, ,,

I

1905	Ibbett, F. W., M.A.	Town Hall
1920	*Elected an Honorary Member	
1927	Ingram, Miss S. I. C., B.SC.	Caldicott, Anthony's Avenue, Parkstone
1926	Innes, A. A.	Old Pines, Ferndown
1925	Insch, J. M.	18 Beechwood Avenue
1925	Insch, Mrs.	,, ,,

J

1926	Jackson, Mrs. C. M.	The Dakota, Beaulieu Road, Alum Chine
1921	Jackson, Mrs. Gidlow	64 Portchester Road
1912	James, T. B.	Trevenen, Howard Road
1912	James, Mrs.	,, ,,
1920	James, S.	,, ,,

1927	Jameson, W. G.	87 Wentworth Avenue, W. Southbourne
1923	Jenkins, Miss B. M.	7 Talbot Avenue
1925	Jones, Miss A. R.	Abbotsfield, 1 Leicester Road, Branksome Park
1922	Jones, J. Williamson	Tyndal Lodge, Forest Road, Branksome Park
1908	aJones, W.	3 Granville Road, Boscombe
1905	Jones, W.	254 Old Christchurch Road
1928	Jordan, Mrs. E. M.	Kirkburn, 9 Dunkeld Road
1928	Jordan, Miss E.	,, ,,
1927	Jourdain, Rev. F. C. R., M.A., M.B.O.U.	4 Belle Vue Road, Southbourne

K

1910	Kay, A. J.	Valliscourt, 100 Lowther Road
1929	Kendall, Mrs.	20 Serpentine Road, Poole
1928	Kendall, Miss G. J., A.R.C.M.	,, ,,
1923	Kenrick, Miss M.	8 St. Luke's Road
1928	Kenway, Miss A. M.	18 Bodorgan Road
1927	Kilburn, Miss Alice M.	9 Glenmoor Road, Winton
1927	Kilburn, Miss Annie	,, ,,
1928	King, F. G.	66 St. Alban's Avenue
1929	Kirkaldy, D.	Grange, Spur Hill Avenue, Parkstone
1929	Kirkaldy, Mrs. A.	,, ,, ,,
1929	Kirkaldy, Miss J.	,, ,, ,,
1929	Kitchin, E. H., M.A., M.B.	Haldon, Canford Cliffs

L

1929	Lamb, Major D. G.	Stourbank, Little Canford, Wimborne
1929	Lamb, Mrs. L. M.	,, ,, ,,
1928	Lane, F. E.	41 St. Alban's Avenue
1923	Lawrence, Mrs.	66 Portchester Road
1929	Lawson, Miss E.	41 Fortescue Road
1929	Lawson, Miss M.	,, ,,
1919	Leech, Miss M. M.	32 Crabton Close Road, Boscombe
1929	Leigh-Hunt, Gerard	4 McKinley Road
1910	Lendrum, Miss A. M.	13 Carysfort Road
1925	Little, J. T., M.A.	Yed Hill, Ringwood
1925	Little, Mrs.	,, ,,
1925	Little, Miss C. J.	,, ,,
1925	Little, Miss S. P., M.A.	,, ,,
1922	Littleboy, Miss E. S.	2 Bodorgan Manor, 12 Bodorgan Road
1923	Littlewood, Engineer Capt. A. W., R.N., retd., O.B.E., Chevalier Legion of Honour	28 Princess Road
1922	Logan, T. T.	10 Argyll Road, Boscombe
1916	Logan, Mrs.	,, ,,
1922	Logan, Miss G. M.	,, ,,
1922	Logan, Miss S. M.	,, ,,
1924	Longbottom, F. W., F.B.A.S.	Haslemere, Penrith Road, Boscombe
1928	Longbottom, Mrs.	,, ,, ,,
1920	aLove, W. J. E.	St. Clement's School House
1903	oLupton, Miss	2 Hengist Road
1909	†Lyon, Claude	Shalimar, Wilderton Road, Branksome Park
1910	Lyon, Mrs.	,, ,, ,,

M

1908	ᴀMackay, Miss	8 King's Park Road
1929	Mackay, Miss C. J.	,, ,,
1911	McBean, Miss J.	Inglenook, 29 Parkwood Road
1909	McBean, Miss S.	St. Michael's, Buxton
1920	Male, H. C., M.D., M.R.C.S.	35 Irving Road, West Southbourne
1925	Male, Miss G. E.	,, ,, ,,
1929	Marchant, Rev. Sir James, K.B.E.	Pine Garth, Buccleuch Road
1917	Marston, Miss G.	Bourne Hall Hotel
1913	Martin, Miss F. G.	32 Southbourne Road
1914	Mate, S. J.	10 Landseer Road
1921	Mate, Mrs.	,, ,,
1918	Matthews, Mrs. J. P.	The Bungalow, Lascelles Road, Boscombe
1921	Mattocks, Mrs.	Meyrick Cliffs Hotel, Beacon Road
1925	Mattocks, C. G. B.	,, ,, ,,
1922	Mattocks, T. E. T.	,, ,, ,,
1928	Maunder, A. V., B.A.	Hinton Firs, 15 Gervis Road
1926	Mears, Miss J. A.	27 St. Alban's Crescent
1929	Meyrick, Sir George, BART.	Hinton Admiral, Christchurch
1926	Miles, Mrs. F. A.	Milestone, 16 Meyrick Park Crescent
1925	Miller, Miss B.	Sunnycroft, 15 Penrith Road, Boscombe
1926	Miller, Miss W. F., B.A.	,, ,, ,,
1922	Moore, Major T. C., I.M.S.	Verwood, Dorset
1919	Moorhead, Mrs.	Brightlands, 34 Crabton Close Road
1908†	*Morris, Sir Daniel, K.C.M.G., J.P., M.A., D.SC., D.C.L., LL.D., F.L.S.	14 Crabton Close Road
1911	Morris, Lady	,, ,,
1926	Morton, Hamilton, M.A., M.D.	Court Lodge, Tower Road, Branksome Park
1908	Moss, Miss	The Grange, 52 Westby Road
1929	Mott, Lady	4 Dingle Road
1924	Moulson, Miss R.	20 St. Stephen's Road
1925	Murray, C. H.	Hallowdene, Belle Vue Road, Parkstone
1928	Muspratt, Brig.-Genl. F. C., C.B., C.M.G.	44 Lansdowne Road

N

1919	Nankivell, B. W., M.R.C.S., L.R.C.P.	Woodstock, 2 West Cliff Road
1925	Newman, Mrs. C. A.	Harewood, 17 Dean Park Road
1929	Nicholl, Mrs. D. S. W.	210 Capstone Road
1928	ᴀNicholls, Miss A. G.	Sainte Marie, Ashton Road, Redhill Park

O

1920	Oaten, Mrs.	19 Sunnyhill Road, West Southbourne
1929	Ogden, Miss E.	Southland, Corfe Castle
1910	Oke, A. W., B.A., LL.M., F.G.S., F.S.A.	32 Denmark Villas, Hove, Brighton
1927	Oldham, H.	Holmesdale, 44 Browning Avenue
1924	Ormrod, T. B.	The Little White House, Penrith Road
1920	Osborne, J. H.	Woodside, Kinson
1922	Ousby-Trew, Rev. C., M.A.	Overthorpe, 19 Florence Road, Boscombe
1922	Ousby-Trew, Mrs.	,, ,, ,, ,,
1922	Ousby-Trew, Miss	,, ,, ,, ,,
1929	Owen, H., B.A., M.B., M.R.C.S.	59 Manor Road
1929	Owen, Mrs.	,, ,,

1929	Owen, J. D.	81 St. Luke's Road
1929	Owen, Miss E. D.	,, ,,
1929	Owen, Miss M. D.	,, ,,

P

1904	Painter, Mrs.	29 Talbot Road
1919	Parker, Miss M.	The Cliff, 13 Southwood Avenue, W. Southbourne
1926	Parrott, F. W.	33 Heathwood Road
1928	Parry, Miss A. K.	Tilneyhirne, St. John's Road, Boscombe
1926	Parton, Miss E. C.	197 Holdenhurst Road
1926	Parton, Miss M. A.	,, ,,
1927	Paterson, Mrs. E. B.	The Grove, Grove Road
1926	Paterson, Miss L.	Corfe Lodge, Parkstone
1926	Paterson, Miss M.	,, ,,
1926	Paterson, Miss N.	,, ,,
1924	Pattinson, Dr. T. W.	59 Wellington Road
1924	Pattinson, Mrs.	,, ,,
1925	Peach, Miss M. E.	12 Bryanston Road
1924	Pells, J.	9 Stokewood Road
1913	†Penrose, F. G., M.D., F.R.C.P., F.Z.S., M.B.O.U.	Woodbury, 9 Grove Road, East Cliff
1916	Penrose, Mrs.	,, ,, ,,
1916	Penrose, Miss F.	,, ,, ,,
1916	Penrose, Miss M., B.SC.	,, ,, ,,
1912	Pestell, Miss	Engelberg, 92 Surrey Road
1929	Phelps, Mrs. J. V.	The Steyne, Manor Road
1911	Phillips, Mrs.	Allendale, New Milton
1921	Phillips, Rev. C. A.	36 Dean Park Road
1921	Phillips, Miss C. E.	,, ,, ,,
1928	Phillips, Rev. F. B.	Charlton Marshall, Blandford
1928	Phillips, Mrs.	,, ,,
1920	Pilkington, Miss L. D.	The Steyne, 9 Manor Road
1927	∧Pocock, Miss E.	67 Wentworth Avenue
1921	Pontifex, R. D.	Dalton House, 68 Christchurch Road
1920	Pontifex, Mrs.	,, ,, ,,
1921	Pontifex, G. K. D.	,, ,, ,,
1926	Potter, Rev. Prof. M. C., M.A., D.SC., F.L.S.	Corley Croft, York Avenue, New Milton
1926	Power, Lady	Newlands Manor, Lymington
1925	Price, L.	Oakwood, Harvey Road, Boscombe
1925	Price, Mrs.	,, ,, ,,
1925	Price, Miss H. B. K.	,, ,, ,,
1918	Punch, Cyril	60 Wellington Road

Q

1922	Quick, R., F.S.A. (Scot.)	Russell-Cotes Art Gallery and Museum
1924	Quick, Mrs.	,, ,, ,, ,,

R

1929	Radford, Miss A.	8 St. Luke's Road
1927	Raine, A. D.	Milverton, Lymington
1927	Raine, Mrs.	,, ,,
1928	Randolph, Miss K.	Island View, Parkstone
1912	Rankin, W. Munn, M.SC. (Leeds), B.SC. (Lond.)	Municipal College, Burnley, Lancs.

1920 *Elected an Honorary Member

1917	Ranshaw, Miss E. M.	9 Warren Road
1918	Ratcliffe, Mrs.	Brooklands, 32 Branksome Wood Road
1926	Rayner, Miss E.	The Homestead, 29 St. John's Road, Boscombe
1919	Rayner, Miss F.	,, ,, ,,
1905	*Rayner, J. F., F.R.H.S., M.B. MYC. S.	Swaythling, Southampton
1922	Rebbeck, Lt. L. E., R.N.	Stafford Lodge, 26 Dean Park Road
1928	Rees, Miss C. St. B. M.	Invermay, Manor Road, Swanage
1927	Rees, Commandant S. J., J.P.	Marsham Court, East Cliff
1923	Reeves, Miss S., M.B.E.	48 Argyll Road, London, W.8.
1924	*Reid, Mrs. E. M., B.SC., F.L.S.	Pinewood, Milford-on-Sea
1928	Reid, Mrs. F. K.	Westminster Hall Hotel, West Cliff
1928	Reid, Miss F. A.	,, ,, ,,
1919	Richards, Miss E. E., B.SC.	West Cliff Towers, 12 Priory Road
1928	Richards, Mrs. E. M.	17 Dunbar Road
1927	Richey, H. A., B.A.	1 Brookside, Exeter Lane
1927	Richey, Mrs.	,, ,,
1926	Rix, Miss M. E. de B.	Wayside, Stourcliffe Avenue
1916	Roberts, H. Astley, B.A.	Shalvah, Wilfred Road, Boscombe
1918	Roberts, Mrs.	,, ,, ,,
1924	Roberts, Mrs. J.	Aysgarth, 16 Poole Road
1924	Roberts, Mrs. W. F. M.	19 Florence Road, Boscombe
1924	Robertson, W. G. A., M.D., D.SC., F.R.C.P., F.R.S.(Edin.), F.S.A.(Scot.)	St. Margaret's, Keswick Road, Boscombe
1927	Robins, F. W., F.R.G.S.	4 Harewood Avenue, West Southbourne
1929	Robinson, Miss M. H.	14 Talbot Avenue
1929	Robinson, Miss W. A.	,, ,,
1928	Robson, Alderman H., J.P.	Mulgrave, Meyrick Park Crescent
1923	Roden, Miss E. M.	14 Campbell Road, Boscombe
1905	Rogers-Barns, Miss	Vergers Mead, Corfe Castle
1914	Rooke, Miss S. G.	Norbury, 53 Paisley Road
1914	*Roper, Miss Ida M., F.L.S.	4 Woodfield Road, Redland, Bristol
1922	Rosling, Mrs.	12 East Avenue
1916	Rothwell, Mrs.	21 Wentworth Avenue, West Southbourne
1925	Ruddle, Mrs. F. J.	12 Richmond Park Crescent
1913	Russell-Cotes, H. V. M.	8 Meyrick Park Crescent

S

1926	Sale, G.	Fixby, Milner Road
1926	Sale, Miss L.	,, ,,
1926	Sale, Miss M.	,, ,,
1926	Sale, V. M.	,, ,,
1925	Saunders, E. W.	Deep Dale, 41 Surrey Road
1925	Saunders, Mrs.	,, ,,
1928	Saunders, E. C.	,, ,,
1928	Saunders, Miss U. G.	,, ,,
1929	Saunders, Mrs. M. S.	14 Princess Road
1919	Savage, J. W.	41 Wentworth Avenue, West Southbourne
1927	Sayle, G. M.	Malvernbury, Watcombe Road
1929	Sayle, Miss P. P.	,, ,,
1915	Scholes, Mrs.	Aldourie, Branksome Wood Road
1922	Scholes, R. D.	,, ,,
1922	Scholes, Miss V. O. M. D.	,, ,,
1926	Scollick, Mrs.	Brundon, 2 Surrey Road
1929	†Scott, Dukinfield H., M.A., LL.D., F.R.S., F.G.S., F.L.S.	Beacon Royal Hotel, West Cliff
1919	Scott, G. B., C.I.E.	Glencoy, 80 Surrey Road
1904	Scott, J. H., M.E., M.I.M.C.E.	Kirkby, 22 Linwood Road

1916	ASeeviour, G. C., A.C.P., F.R.H.S.	St. Peter's School House
1926	Seymour, Mrs. A. J.	Kempsey Hotel, Bath Road
1926	Shann, W. A., M.B.	Hinton Firs, 9 Manor Road
1928	Sharp, Miss A. M.	23 Churchill Road
1914	Sharp, C.	Langdon, Parkstone
1919	Sharp, Miss E.	,, ,,
1919	Sharp, Miss F.	,, ,,
1927	Sherrard, Miss L. J.	Royal Bath Hotel
1903	G*oSherring, R. Vowell, F.L.S.	Hallatrow, near Bristol
1907	Sherring, Miss O. L.	,, ,,
1926	Shipman, Lt.-Col. H. J.	28 Surrey Road
1916	Simpson, Rev. E. J. Douglas, M.A.	Maesbury, 3 Cavendish Road
1920	Simpson, N. Douglas, B.A., F.R.M.S., F.L.S.	,, ,,
1927	Sitwell, H. W. W.	Glenconnor, Ferndown
1927	Sitwell, Miss M. R.	,, ,,
1929	Smith, Miss E. G. C.	16 Gerald Road
1925	Smith, H. H.	9 Cambridge Road
1926	Smith, Mrs.	,, ,,
1918	Smith, Horace, M.A., M.D.	Sunnyhurst, 7 Dean Park Road
1918	Smith, Miss M. A.	Woodside, St. Alban's Crescent
1914	Smyth, W. Johnson, M.D.	Killalief, 534 Holdenhurst Road
1922	Smyth, Mrs.	,, ,,
1922	Smyth, Miss M.	,, ,,
1912	Smythe, J. H. Ralph, J.P.	Willstead, 22 Cavendish Road
1915	Smythe, Mrs.	,, ,,
1920	Smythe, Miss D.	,, ,,
1916	Smythe, Miss K. M.	,, ,,
1919	Snell, S. H., M.D., M.B.O.U,	1 Portman Crescent
1919	Snell, Mrs.	,, ,,
1921	Sowton, Miss E. M.	Singleton, 48 Newstead Road
1922	Speakman, Mrs. E.	13 Milton Road
1909	Spencer, J. F.	Glenthorne, 73 Richmond Park Road
1923	Stables, A. D.	Saxthorpe, St. Osmund's Road, Parkstone
1923	Stables, Mrs.	,, ,, ,, ,,
1926	Standring, J.	Naseby Nye, Byron Road, Boscombe
1926	Standring, Mrs.	,, ,, ,,
1923	Starr, Col. W. H., C.B., C.M.G., C.B.E.	4 Foxholes Road, Southbourne
1921	Stevens, C. S.	Goodwin, Howard Road
1928	Stiff, Miss F. M.	Grosvenor Hotel, Chine Crescent
1929	Stiff, Miss M. I.	,, ,,
1916	Stiff, S. J., B.SC.	Norden House, Corfe Castle
1916	Stiff, Mrs.	,, ,,
1916	Stiff, Miss M. J.	,, ,,
1928	Stone, Miss E. J.	7 Strouden Avenue
1929	Stone, Miss M. A.	,, ,,
1920	Stoney, Miss F. A., O.B.E., M.D., B.S.	12 Burnaby Road
1924	Story, F. N.	Storyland, Church Road, Southbourne
1924	Story, Mrs.	,, ,, ,, ,,
1918	G†*Sumner, Heywood, F.S.A.	Cuckoo Hill, South Gorley, Fordingbridge
1928	Sutherland, W.	Silverdale, 20 Penn Hill Avenue, Parkstone
1928	Sutherland, Mrs.	,, ,, ,,
1906	Swallow, E.	York Cottage, Ravine Road, Canford Cliffs
1929	Symes, Rev. E. C., M.A.	West Parley Rectory, Wimborne
1929	Symes, Mrs.	,, ,,
1922	ASymes, H., M.A.	52 Lowther Road

T

1911	Tatchell, Leonard, F.E.S.	Swanage, Dorset
1915	Taylor, F. B., B.A.	Claregarth, Montague Road, W. Southbourne
1916	Taylor, Mrs.	" " " "
1916	Taylor, Miss M. W.	" " " "
1928	Taylor, Mrs. R. A.	17 Dunbar Road
1928	AThackeray, Miss E., B.A.	Flat 9, 6 Wimborne Road
1923	Thill, J. A.	8 Colville Road, Boscombe
1923	Thill, Mrs.	" "
1925	AThomasson, Miss M. E.	37 Belvedere Road
1927	Thompson, E. H.	14 Drummond Road
1928	Thompson, Rev. J. C., F.G.S.	Cragside, Manor Road, New Milton
1929	Thomson, A. G. A., M.A., M.B.	38 Wentworth Avenue, Boscombe
1922	Thomson, A. W. Ferguson	Ailsa, Erpingham Road
1928	Thomson, Mrs.	" "
1911	Thomson, Mrs. Roberts	Monkchester, 17 Manor Road
1928	Thornton, Mrs. Sykes	Moorland Court, Queen's Park West Drive
1919	Thoroton, Rev. L. E. W.	Hill House, Spencer Road, Canford Cliffs
1911	Tickell, Miss S. M.	Capri, 90 Richmond Park Avenue
1929	Tucker, Mrs. E. M.	39 Hamilton Road
1929	Tucker, Miss E.	" "
1911	Turner, J. E.	Bramley, 94 Surrey Road
1914	Twemlow, Miss E. E.	Devon Lodge, 83 Alumhurst Road

V

1913	Veale, Miss A. G.	2 Richmond Park Crescent
1923	Veale, Miss B.	" "
1923	Veale, Miss C. M.	" "
1923	Veale, Miss L. H.	" "
1908	Vernon, Lieut.-Col., A. H., L.R.C.P., F.R.C.S.	Drayton, 19 Queen's Park Gardens
1918	AVorse, John	Leighurst, Walkford, Christchurch

W

1903	Go†Waddington, H. J.	Moreton, 107 Lowther Road
1918	*Elected an Honorary Member	
1924	AWadlow, H. E.	The Gables, Queen's Grove, Parkstone
1916	Walby, A. E.	Netherton, 2 Dean Park Road
1921	Wales, Miss	The Nook, 4 Ormonde Road, Branksome Park
1921	Wales, Miss N.	" " " "
1918	Walker, R. S.	Meyrick Cliffs Hotel
1913	Wallace, W. G.	Doveshill Cottage, Ensbury Park
1912	Walter, Mrs. G. P.	Rusholme, 10 St. Anthony's Road
1920	Wanstall, W. S.	Del Monte, 6 Roslin Road
1920	Wanstall, Mrs.	" "
1927	Ward, H. P.	Braemar, Egerton Road
1928	Watson, Miss E. M.	20 Southwood Avenue
1928	AWebber, A. E.	28 Tower Road, Boscombe
1928	Webber, Miss M. A.	Stoke, Stokewood Road
1928	Welfitt-Nicholls, Miss A.	70a, Drummond Road
1928	Welfitt-Nicholls, Miss C.	" "
1928	Welfitt-Nicholls, Miss E.	" "
1920	Wells, Rev. E., M.A.	Glen Roy, 22 Studland Road
1913	Wetherell, Miss M.	Triana, 21 Harvey Road, Boscombe
1920	Wetherell, Miss S.	" " " "

1918	Whitaker, S.	22 Somerset Road, Boscombe
1924	Whitaker, Miss E. M.	,, ,,
1924	Whitaker, S. E., M.S.A.	22 Selwood Road, Addiscombe, Croydon
1921	White, Mrs. E. Sinclair	35 East Avenue
1920	White, J. R., M.A.	Whitecot, 15 Linwood Road
1920	White, Mrs.	,, ,,
1929	Whiteley, F. W.	7 Charminster Road
1929	Whitley, A.	Dorney, Norton Road, Winton
1928	Wiggins, Mrs. A. L.	Gorseside, Mudeford, Christchurch
1927	Wigmore, A. J., B.A., M.R.C.S., L.R.C.P.	Aymestrey, Tuckton Road, Southbourne
1927	Wigmore, Mrs.	,, ,, ,,
1927	Wigmore, Miss	,, ,, ,,
1919	Williams, John	Brynmill, 68 Southcote Road
1926	Williamson, H. J.	Quiddington, Birchwood Road, Parkstone
1924 A	Willis, Miss G. H.	116 Paisley Road, West Southbourne
1920	Woodhouse, Rev. A. P.	Deanhurst, 5 Littledown Road
1905	Woodhouse, W. J., A.C.P., M.I.H.	35 Chatsworth Road, Malmesbury Park
1918	Woodhouse, Mrs.	,, ,, ,, ,,
1923	Woodhouse, W. R.	,, ,, ,, ,,
1923	Woodhouse, Miss M. M.	,, ,, ,, ,,
1928	Wright, J.	Ranmoor, Motcombe Road, Branksome Park

Y

1924	Yates, Rev. A. G., M.A., R.N.	14 Wellington Road
1924	Yates, Mrs.	,, ,,
1924	Yates, Miss E. M. M.	,, ,,
1928	Young, Mrs. E.	Dunelm, Brackendale Road
1929	Young, H. T.	11 Borthwick Road, Boscombe
1929	Young, Miss E	,, ,,

RULES OF THE
Bournemouth Natural Science Society.

(As amended, October 1928.)

Title

1.—The title of the Society shall be THE BOURNEMOUTH NATURAL SCIENCE SOCIETY.

Objects

2.—The objects of the Society shall be:

(*a*) The promotion of the study of Science in all its branches, by means of Lectures, Field Meetings, the Reading and Discussion of Papers, the formation of Sections of its members devoted to any particular branch of the Society's work, and in any way that the Council of the Society shall deem advisable.

(*b*) The making of reports on any animal, plant, or object of interest, and the carrying out of the recommendations contained in such reports.

Members

3.—The Society shall consist of Ordinary, Life, Honorary and Associate Members.

Ordinary Members

4.—Ordinary Members shall pay an Annual Subscription of One Pound, due on the first day of October in each Year. The inclusive Annual Subscription for Adult Members of the same family, not exceeding four and residing in the same house, shall be Two Pounds, each Member being elected in the usual manner and each receiving a card of membership. Persons living outside a radius of six miles from the Square at Bournemouth may be elected Country Members, and pay one half the above rates of subscription.

Life Members

5.—The Subscription for Life Members shall be Ten Pounds. Any Ordinary Member who shall have commuted his Subscription, as provided for in this Rule, shall become a Life Member, but shall not by reason thereof have any rights differing from those of an Ordinary Member.

¶ Rules 5a and 5b referred to in the Trust Deed are Rules 19 and 20.

Honorary Members

6.—Any person distinguished in Science or who has rendered any special service to the Society, may be elected an Honorary Member. Honorary Members shall be proposed and elected in the same way as Ordinary Members. The number of Honorary Members shall be limited to twenty.

Associate Members

7.—Persons may be admitted Associate Members by the Council on account of their scientific attainments or because they are likely to prove useful working Members of the Society. This privilege will usually be granted to School Teachers.

The annual subscription for Associate Members shall be seven shillings and sixpence. They shall be entitled to all the privileges of Membership except that they shall have no power of voting on the affairs of the Society or of holding office.

Proposal and Election of Members

8.—The Ordinary, Life, and Associate Members of the Society shall be proposed by a Member to whom they are known personally or to whom they have presented adequate credentials, and seconded by another Member, and the proposal, in the form following these Rules, shall be sent to the Honorary Secretary. The name of any such proposed new Member shall be posted on the Notice Board of the Society for a period of not less than seven days, after which such name shall be voted upon at the next ensuing Council Meeting, and if two-thirds of the Council present and voting shall vote for the proposed New Member, such Candidate shall become a Member upon payment of the Annual Subscription and shall receive a Card of Membership which is not transferable. Any Member joining during August or September shall receive a Card of Membership to September 30th of the following year without further payment.

Unpaid Subscriptions

9.—Any Members whose subscriptions are unpaid at the end of the financial year (September 30th), after notice in writing to that effect has been given to them by the Honorary Treasurer, shall be reported to the Council, which shall have the power of removing their names from the list of members.

Resignations

10.—Resignations must be in writing and addressed to the Honorary Secretary. Members are liable for all subscriptions which may have fallen due prior to the date of resignation.

Executive Officers.

11.—The Executive Officers of the Society shall be the Chairman of Council, the Deputy Chairman of Council, Honorary Treasurer, and Honorary Secretary.

The President

12.—The President shall be elected annually and need not necessarily be selected from Members of the Society. He shall be invited to deliver an Address at as early a date in the Winter Session as can be arranged.

Vice-Presidents

13.—Any Member of the Society who, in the opinion of the Council, has rendered distinguished service to Science or to the Society, shall be eligible for election as a Vice-President at the Annual Meeting and, if elected, shall retain office as long as he remains a Member of the Society.

Chairman of General Meetings

14.—The President or a Vice-President shall take the Chair at all General Meetings other than the Annual and Special Meetings. At these the Chairman of Council or Deputy Chairman shall preside.

Honorary Secretary

15.—The Honorary Secretary shall perform all the usual secretarial work, shall keep minutes of all Council Meetings, and of the Annual and Special Meetings, and make a synopsis of all other General Meetings. He shall cause the agenda of the Annual and Special Meetings to be sent to every Member seven days at least before each such Meeting. He shall make all preparations for General Meetings and General Excursions, in respect of which he shall collect from each Member his share of the expenses, and therefrom defray all costs of the Meetings or Excursions.* Any surplus of such collections shall go to the General Fund, and any deficit be defrayed out of that Fund. He shall keep an account of all out-of-pocket expenses. He shall give notice of their election to all new members, and register the Sections, if any, to which they ask to belong. He shall furnish copies of the Annual Reports published during their membership, to all Members who have paid their subscriptions, the number of copies of the "Proceedings" supplied in respect of each family subscription shall not exceed two; to Honorary Members, and to such Scientific Societies as the Council may from time to time appoint to receive them.

*Note.—Tickets may be returned and the money refunded up to the expiration of the time for taking tickets for any Excursion; after that date, no money can be refunded even if the tickets are not used.

Honorary Treasurer

16.—The Honorary Treasurer shall have the custody of the General Funds of the Society. He shall receive and acknowledge all Subscriptions, and shall issue tickets of Membership to all persons who are duly elected and have paid their Subscriptions. He shall bring before the Council any accounts that are due for payment. He shall prepare a financial Statement at the end of each Financial Year to be presented to the Council at the Meeting next preceding the Annual Meeting. After presentation of the Financial Statement to the Council, he shall submit it to the Auditors and lastly to the Annual Meeting of the Society.

Council

17.—There shall be a Council of the Society consisting of the Vice-Presidents who have filled the office of President, the Honorary Treasurer, the Honorary Secretary, the Honorary Librarian, the Honorary Editor, the Honorary Curator, the Chairmen of Sections, not more than ten Members elected by the Society and not more than two co-opted Members.

18 (*a*).—The Council shall have the general management of the Society and the control of its funds. At all Meetings of the Council, five shall form a quorum. The Council shall elect its own Chairman and Deputy Chairman for the Year, shall have power to fill up vacancies in its number, and to co-opt not more than two additional members. The Council shall have power to appoint Committees to deal with any business that may be delegated to them.

(*b*) The Chairman, or in his absence the Deputy Chairman, shall have an original and a casting vote at all Meetings of the Council.

(*c*) The Council shall arrange all Lectures, Papers, Demonstrations and Exhibitions of Specimens, etc., for the General Meetings and Excursions of the Society, and shall approve of all arrangements for Sectional Meetings and Excursions before they are included in the monthly programme.

(*d*) If any elected or co-opted member of the Council shall fail to attend four consecutive Meetings of the Council, his seat shall become vacant unless the Council shall decide otherwise.

Trustees

19.—The property of the Society shall be vested in Trustees who shall be elected by the Council. The number of Trustees shall be not more than nine or less than three, and they shall respectively hold office until death or resignation, unless removed from office by a resolution of the Council. The Trustees shall from time to time deal with the property of the Society as directed by resolution of the Council (of which an entry in the minute book shall be conclusive evidence), and they shall be indemnified against all liability whatsoever out of the property for the time being of the Society.

¶ This Rule is referred to in the Trust Deed as Rule 5a.

Borrowing Power

20.—If at any time the Society in general meeting shall pass a resolution authorising the Council to borrow money, the Council shall thereupon be empowered to borrow for the purposes of the Society such amount of money, either at one time or from time to time, and at such rate of interest, and in such form and manner, and upon such security as shall be specified in such resolution, and thereupon the Trustees shall make all such dispositions of the property of the Society or any part thereof, and enter into such agreements or arrangements in relation thereto, as the Council may by resolution direct for giving security for such loan or loans and interest thereon at the agreed rate. All members of the Society, whether voting on such resolution or not, and all persons becoming members of the Society after the passing of such resolution shall be deemed to have assented to the same as if they had voted in favour of such resolution.

¶ This Rule is referred to in the Trust Deed as Rule 5b.

Visitors

21 (*a*).—A Member may introduce friends who accompany him to all parts of the Society's premises except those which are let or in use for a Lecture or Meeting. The Member must enter the names and addresses of such Visitors in the Visitors' Book and sign the entry. Strangers cannot be admitted on presenting a Member's card or letter.

(*b*) A Member may introduce two Non-Members, who accompany him, to any Lecture or Excursion of the Society, but no Non-Member may be thus introduced to more than two Lectures in the Winter Session and two Excursions in the Summer Session, even though introduced by different Members. In the case of Lectures, the introducing Member must enter the names and addresses of the Visitors in the Visitors' Book and sign the entry. In the case of Excursions, the introducing Member must send the names and addresses to the Organiser of the Excursion.

(*c*) A Member introducing a Visitor is responsible for ascertaining that the Visitor has not been introduced twice previously in that Session and also that the privilege is not used for commercial purposes.

(*d*) A Visitor to Bournemouth may, with the approval of the Council, be granted a ticket enabling him to attend the Meetings and Excursions of the Society for a period not exceeding six months at a charge of Fifteen Shillings.

(*e*) The Council shall have power to extend the hospitality of the Society to distinguished Visitors.

(*f*) The Council shall have power temporarily to alter or suspend this Rule or any part of it.

NOTE.—Nothing in this Rule shall prevent the Chairman of a Section from introducing, at any time, a non-member who offers a communication of interest to his Section.

Charges for Meetings

22.—The Council shall have power to make a charge to Members for admission to any Meeting the holding of which involves special expenses, and may arrange for the admission of Non-Members.

Expulsion

23.—The power of expulsion of a Member from the Society for objectionable conduct shall be vested in the Council and exercised at a Special Meeting called for that purpose. Notice of the proposed expulsion must be given on the circular convening the Meeting. The expulsion must be carried by a majority of two-thirds of those present.

The Member affected shall have power to appeal to a General Meeting of the Society to act by the like majority.

24 (*a*).—The Annual Meeting shall be held in the month of October.

(*b*) At this Meeting the President, the Chairmen of Sections, the Honorary Treasurer, the Honorary Secretary, the Honorary Librarian, the Honorary Editor, the Honorary Curator, not more than ten Members of the Council and two Auditors for the ensuing year shall be elected, either Auditor having the power to audit the accounts in the absence of the other.

(*c*) At this Meeting the Council's Report for the past year, and the Honorary Treasurer's statement of accounts duly signed by the Auditors, shall be submitted.

(*d*) Notice convening an Annual or Special Meeting, together with the agenda and details of any proposed alterations in the Rules, shall be given to Members at least seven clear days before such Meeting is held. Notice of General Meetings shall be given at least seven clear days beforehand.

(*e*) On a written Requisition, signed by at least ten Members of the Society, the Council shall call a Special Meeting to consider any question as to the affairs of the Society, such Meeting to be called within three weeks of the Council Meeting next following the receipt by the Honorary Secretary of the Requisition, and at least seven clear days' Notice shall be given to the Members. At such Meeting no other business than that mentioned on the Requisition, and on the notice convening such Meeting, shall be considered.

(*f*) At the Annual Meeting and at all Special Meetings of the Society, not less than twenty-five Members shall form a quorum.

Section

25 (*a*).—The Council shall have power to form a Section for the study of any special subject deemed within the scope of the Society's work, and shall appoint the Chairman for the first year.

(*b*) The Chairman of each Section shall appoint a Secretary for the Section, who, in addition to the ordinary secretarial duties, shall keep a list of the Members of the Section.

(*c*) A Section shall consist of those Members who have signified to the Honorary Secretary or the Secretary of the Section their wish to belong to that Section.

(*d*) The Members of each existing Section shall, at a Meeting held before the last week in July in each year, nominate the Chairman of the Section for the ensuing year to come into office after the Annual Meeting. The Secretary of the Section shall send such Nomination to the Honorary Secretary in time to present it at the Council Meeting held on the last Monday in July.

(*e*) If the Council approve of the Nomination, it shall recommend the person nominated for Election at the Annual Meeting, otherwise it shall refer the matter back to the Section. In the event of a Section failing to nominate a Chairman, the Council shall have the right to do so. The final Election shall take place at the Annual Meeting.

(*f*) At the request of the Sectional Chairman the Secretary of a Section may attend Meetings of the Council, but without the power of voting.

(*g*) Each Sectional Chairman shall be responsible for the preparation and arrangement of each Sectional Meeting and Excursion, and shall furnish details of the same to the Honorary Secretary for submission to the Council. At the end of each Session he shall render to the Honorary Treasurer an account of his receipts and payments for the Section.

NOTE.—As under Rule 15.

(*h*) A Minute Book for each Section shall be kept in which shall be entered details of the Section's work and an account of all Sectional Meetings, with the number of Members attending and notes on any matters of interest observed or discussed. Such book shall be submitted to the Council whenever required. The Chairman of each Section shall send to the Honorary Secretary a report of the Section's work for the year in time for it to be epitomised in the Council's Report to the Annual Meeting.

Alteration in Rules

26.—Alterations in the Rules must be sanctioned by a majority of not less than two-thirds of the Members present and voting at the Annual Meeting, or at a Special Meeting called for that purpose, and no alterations shall otherwise be made.

To the Honorary Secretary,

Bournemouth Natural Science Society,

39, CHRISTCHURCH ROAD, BOURNEMOUTH.

Dear Sir,

I beg to propose that

M.....

(Please give Christian name in full, and state title—Mr., Mrs., Miss, etc., and any degrees or qualifications.)

Address..... .....

.....

**who is personally known to me*
**who has produced satisfactory credentials to me* *be elected an* **Ordinary* **Associate*

Member of the Society.

Date..... *Member's Signature*.....

I beg to second the above proposal

Date..... *Member's Signature*.....

*Delete word not applicable. See extract from Rules on reverse of this form.

FORM OF LEGACY.

The following FORM OF BEQUEST is recommended for adoption by those who may be desirous of leaving by Will money for promoting the objects and work of the Society :—

I give absolutely to the Treasurer for the time being of the Bournemouth Natural Science Society of No. 39 Christchurch Road, Bournemouth, for the general purposes of the Society the sum of £ s. d. free of duty, and I declare that the receipt of the said Treasurer for the time being shall be sufficient discharge for the said legacy.

Annual Meeting, 1929.

The Twenty-sixth Annual Meeting was held at 39 Christchurch Road on Saturday, October 19th, at 3 p.m., in the New Lecture Hall, the chair being taken by the Rev. C. O. S. Hatton.

The Minutes of the last Annual Meeting, and of the Special General Meeting, at which the new building scheme was approved and carried, were read and passed. The Council's Report and the Statement of Accounts for the year were adopted on the proposition of Rev. C. V. Goddard, seconded by Mr. Williamson Jones. A cordial vote of thanks to the retiring President, Mr. Claude Lyon, for his great interest in the Society's welfare, was moved by Dr. Crallan, seconded by Mr. John Williams and carried. The election to the vacant office of Professor F. O. Bower, D.Sc., F.R.S., President-elect of the British Association, having been proposed by the Chairman, seconded by Dr. Penrose, and carried by acclamation, Professor Bower was declared duly elected President for 1929. Mr. J. H. Ralph Smythe having, through ill-health, vacated his seat on the Council, his name was added to the list of Vice-Presidents on the motion of Dr. Penrose, seconded by Miss Rooke.

There followed the re-election of Officers, proposed by Mr. Hayes Barratt, and seconded by Dr. Shann; of the Council, including Miss C. H. Fryer instead of Mr. Ralph Smythe, proposed by Colonel Starr and seconded by Mr. Arthur Gray; and of Chairmen of Sections, including, in the Physical Section Miss M. Penrose, B.Sc., in the Astronomical Section Mr. J. Arthur Formoy, F.R.A.S., and in the Entomological Section Mr. Alan Druitt, F.E.S., proposed by the Chair and seconded by Mr. Parrott. Mr. Richey offered the thanks of the Society to the Hon. Auditor, Mr. Bicker, and proposed the appointment of Messrs. E. Bicker and Son, and of Mr. F. Broad, as Hon. Auditors for the coming year. This was seconded by Mr. F. B. Taylor and carried.

A vote of thanks to the Chairman, proposed by Mr. Price and seconded by Mr. Hill, brought the formal proceedings to a close. In returning thanks, the Chairman expressed the readiness of the Council to entertain suggestions from members, affecting the comfort and welfare of the Society, and cordially invited support of the new institution of Club Day, which was intended to promote informal intercourse between members, and to maintain the pleasant social atmosphere, for which the Society owed so much to the genial influence of the late Secretary, Mr. R. A. de Paiva.

Council's Report, 1929.

THE Council has pleasure in presenting its Twenty-sixth Annual Report. Our Members now number 611. At the last Annual Meeting we had 586 members, showing an increase of 25 during the past year.

The number of Honorary Members is 14, and of Associate Members 21; the number of Past Presidents still on the Roll of Members is 6; the number of original Members is now 8. The names of this memorable band of pioneers are: Dr. Crallan, Mr. Parkinson Curtis, Dr. Dixon, Miss Firbank, Miss Lupton, Mr. R. Vowell Sherring, Mr. Waddington, and Mr. W. J. Woodhouse. We are very grateful to them for forming our Society and they themselves must be very gratified at the great success which has crowned their early venture.

The Society was founded in August 1903, at Pen Selwood, the residence of Miss C. Agnes Rooper.

During the past year the following General and other Meetings have been held:—

Annual Meeting
Presidential Address
15 General Lectures and Meetings
65 Sectional Lectures and Meetings
6 General Excursions
37 Sectional Excursions

making a total of 125 Meetings and Excursions. Last year the total number was 127.

General Lectures and Meetings.

(*Illustrated by Lantern Slides.)

1928.
Oct. 27.—Annual General Meeting.
*Nov. 10.—"A Visit to the Site of Ostia,"
by Dame Emily Penrose, D.B.E., M.A., D.C.L.
*Nov. 17.—"The History and Development of Electricity,"
by Mr. G. S. Francis.
Dec. 1.—Presidential Address, by Mr. Claude Lyon, "Some Notable Inventions and Discoveries."
1929.
*Jan. 5.—"Bournemouth, Ancient and Modern,"
by Mr. R. Quick, F.S.A. (Scot.).
*Jan. 11.—Children's Lecture,
by Mr. Claude Lyon, "Our Empire, and What we Get from it."
*Jan. 19.—"Laws of Inheritance in Man,"
by Mr. W. Munn Rankin, M.Sc., B.Sc.
*Feb. 16.—"Photographic Reminiscences,"
by Surg.-Capt. G. G. Borrett, R.N.
*March 6.—"The Sport of Mountain Photography,"
by Mr. Arthur Gardner, M.A., F.S.A.
March 7.—Special General Meeting.
May 13.—Club Day.

*May 28.—" Barrington Court and Ilminster,"
by Mr. E. Dodshon, LL.B.
June 11.—" Local Birds,"
by Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U.
June 13.—Club Day.
July 8.—Club Day.
Laying of the Foundation Stone of the New Lecture Hall by Lady Morris.
Aug. 19.—Club Day.
Oct. 14.—Opening of New Lecture Hall by Sir George Meyrick, Bart.

Sectional Lectures and Meetings.

Archæological and Historical Section.

1928.
*Nov. 9.—" Christchurch,"
by Miss Rose L. Benns.
*Nov. 22.—" Caerleon and Hastings,"
by Col. J. R. Dodd, M.D., F.R.C.S.
*Dec. 10.—" The Bronze Age in the South of England,"
by Mr. H. St. George Gray.
1929.
Jan. 8.—" Recent Additions to the Historical Records of West Parley and Neighbourhood,"
by Lt.-Col. C. D. Drew, D.S.O.
*Jan. 26.—" Norman Architecture,"
by Mr. S. E. Whitaker, A.R.S.I.
*Feb. 9.—" Northward with the Roman Legions,"
by Mr. F. W. Robins, F.R.G.S.
Feb. 27.—" Natural Landmarks in Bournemouth and the New Forest Districts,"
by Mr. Heywood Sumner, F.S.A.
*March 5.—" Prehistoric Earthworks,"
by Dr. R. C. C. Clay, F.S.A.
*March 20.—" Archæology in Wessex during 1928,"
by Col. E. B. Anderson, C.B.E.

Astronomical Section.

1928.
*Nov. 7.—" The Birth and Growth of Suns,"
by Mr. J. Arthur Formoy, F.R.A.S.
Dec. 4.—" The Life History of Stars,"
by Mr. L. B. Benny, M.A., F.R.A.S.
1929.
*Jan. 24.—" A Chat on Variable Stars,"
by Mr. G. P. B. Hallowes, F.R.A.S.
*Feb. 20.—" The Evolution of Suns,"
by Mr. J. Arthur Formoy, F.R.A.S.
March 15.—" A Century of Progress in Astronomy,"
by Mr. L. B. Benny, M.A., F.R.A.S.

Botanical Section.

1928.
Nov. 20.—" Plants seen during 1928,"
by Mr. L. Beeching Hall, F.L.S.
*Nov. 27.—" Aspects of Ceylon Vegetation,"
by the Rev. M. C. Potter, M.A., D.Sc., F.L.S.
Dec. 18.—A Discussion on " The Leguminosae,"
opened by Miss S. G. Rooke.
1929.
Jan. 22.—A Discussion on " Some Microscopic Plants,"
opened by Surg.-Capt. G. G. Borrett, R.N.

Jan. 29.—" At Home."
*Feb. 5.—" The Germination of Seeds,"
by Miss Helena V. Davies, B.Sc.
*Feb. 19.—" Landscape and Surface Soil,"
by Mr. L. Beeching Hall, F.L.S.
*March 12.—" A Loaf of Bread,"
by the Rev. Professor M. C. Potter, M.A., D.Sc., F.L.S.
March 19.—" Plants seen in Canada,"
by Mrs. Rothwell.

Entomological Section.

1928.
Nov. 15.—" Remarks on Lepidoptera seen in the Bournemouth Neighbourhood,"
by Mr. Howard Lacey, B.A.
Dec. 14.—" The Theclas and Hesperids,"
by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.
1929.
Jan. 17.—" A Talk on Insects in General,"
by Surg.-Capt. G. G. Borrett, R.N.
*April 18.—" A Talk on a few Insect Friends and Foes of the Garden,"
by Mr. S. Whitaker.

Geographical Section.

1928.
*Nov. 13.—" A Trip to South America,"
by Alderman Henry Robson, J.P.
*Nov. 28.—" Afghanistan and the Afghans,"
by Mr. G. B. Scott, C.I.E.
*Dec. 5.—" North African French Colonies,"
by the Rev. F. C. R. Jourdain, M.A., M.B.O.U.
*Dec. 11.—" My Trip to India and Ceylon,"
by Dr. W. Gosse.
1929.
*Jan. 4.—" London's History and Romance,"
a contributed Lecture, read by Mr. Claude Lyon.
*Jan. 12.—" Among the Aztecs and Mayas,"
by Miss E. E. Twemlow.
*Feb. 2.—" The Tower of London," by Mr. R. Quick, F.S.A. (Scot.).
*March 11.—" Spitzbergen," by Miss Law.
*April 11.—" The Vine-lands of Southern France,"
by Miss S. Miller, B.A.
May 4.—" At Home."

Geological Section.

1928.
*Nov. 3.—" Early Chapters in the Earth's History,"
by Mr. Henry Bury, F.G.S.
*Dec. 13.—" Sea Level and its Geological Variations,"
by Mr. Henry Bury, F.G.S.
1929.
*Feb. 14.—" Coal, and its Story,"
by Mr. R. K. Cardew, B.A.
*March 16.—" The Geology of the Alps,"
by Mr. E. St. John Burton, F.G.S., F.L.S., F.Z.S.
*March 22.—" Some Extinct Volcanoes of the Auvergne,"
by Dr. Alfred J. Wigmore, B.A., M.R.C.S., L.R.C.P.
*April 23.—" The Natural History of Clay,"
by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.

Microscopical Section.

Exhibitions of Objects of Interest with the following Special Subjects:—

1928.
Oct. 18.—" Diatoms."
Nov. 15.—The New Microscope, presented by Dr. Crallan.
*Dec. 14.—Objects of Interest Through the Lantern.
1929.
Jan. 17.—" Mostly Botanical."
Feb. 21.—" Antennae of Insects."
March 14.—" Wings."
April 18.—" Objects of Interest."
May 16.—" Objects of Interest."
June 20.—" Objects of Interest."
July 18.—" Pond Life."
Aug. 15.—" Pond Life."

Photographic and Record Section.

1928.
*Nov. 24.—" The Photographic Negative."
by Mr. W. Dieselhorst, A.M.I.C.E.
*Dec. 15.—" Mountain Photography,"
by Mr. E. Dodshon, LL.B.
1929.
*Jan. 23.—" With Caravan and Camera through Somerset and Cornwall,"
by Mr. H. I. W. Williamson.
*April 24.—" The Story of Photography,"
by Mr. Claude Lyon.

Physical Section.

1929.
*Jan. 18.—" Glass and Glass-making,"
by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.
Feb. 23.—" The Measurement of Gravity at Sea,"
by Mr. T. H. Littlewood, M.A., B.Sc.
March 27.—" Some Liquids and their Properties,"
by Miss Marcia Penrose, B.Sc.
April 16.—" A Talk on Minerals,"
by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.

Zoological Section.

1928.
*Nov. 21.—" Our Forefathers' Quaint Ideas Regarding Animals,"
by Mrs. Aitchison Robertson, M.D., F.R.S.G.S.
1929.
Jan. 30.—" A Popular Talk on Birds,"
by Dr. S. H. Snell, M.B.O.U.
*March 9.—" A Naturalist's Holiday in Provence,"
by Hugh Main, B.Sc., F.E.S., F.Z.S.

General Excursions and their Leaders.

1929.
May 25.—Melbury Park and Cattistock, Mr. R. K. Cardew, B.A.
June 8.—Barrington Court and Ilminster, Mr. E. Dodshon, LL.B.
July 2.—Canford School, Mr. R. K. Cardew, B.A.
Aug. 14.—Devizes and Wiltshire Country, Dr. S. H. Snell, M.B.O.U.
Sept. 11.—Bradford-on-Avon, Dr. S. H. Snell, M.B.O.U.
Sept. 28.—South Petherton and Crewkerne, Mr. E. Dodshon, LL.B.

Sectional Excursions and their Leaders.

1928.

Oct. 2.—Dewlish and Culpepper's Dish, Mr. Henry Bury, F.G.S., and Mr. R. K. Cardew, B.A. (Geological).

Oct. 11.—Brockenhurst—Fungus Foray, Mr. J. F. Rayner, M.B.Myc.S. (Botanical).

Oct. 23.—Lyndhurst Road, Mr. J. Vorse (Botanical and Entomological).

1929.

April 9.—Studland, Mr. L. Beeching Hall, F.L.S. (Botanical).

April 25.—Corfe, Mr. L. Beeching Hall, F.L.S. (Botanical).

April 27.—Merritown and Parley, Mr. R. K. Cardew, B.A., and Lieut.-Col. C. D. Drew, F.S.A., D.S.O. (Archæological and Historical).

May 7.—New Milton, Mr. J. Vorse (Botanical).

May 10.—St. Oswald's Bay and Dungy Head, Mr. E. St. John Burton, F.G.S. (Geological).

May 14.—Cowgrove and Pamphill, Mr. R. K. Cardew, B.A. (Botanical).

May 23.—Cranemoor and Walkford Commons, Rev. C. O. S. Hatton, B.A., F.L.S. (Botanical).

May 27.—Mount Ararat, Mr. Heywood Sumner, F.S.A. (Archæological and Historical).

May 29.—Wareham, Miss S. G. Rooke (Botanical).

June 7.—Wool, Surg.-Capt. Borrett, R.N. (Entomological).

June 10.—Spetisbury, Mr. R. K. Cardew, B.A. (Botanical).

June 11.—Kingston Maurward Gardens, Mr. Claude Lyon (Geographical).

June 17.—Old Sarum, and Salisbury Museum, Col. E. B. Anderson, C.B.E. (Archæological and Historical).

June 18.—Brockenhurst, Mr. H. J. Wadlow (Botanical).

June 25.—Corfe, Miss Rogers-Barns (Botanical).

June 27.—Bournemouth and New Forest Plateaux, Mr. Henry Bury, F.G.S. (Geological).

July 4.—East Lulworth, Mr. H. J. Wadlow (Botanical).

July 11.—Hurn to Christchurch, Miss C. H. Fryer (Botanical).

July 16.—Hod Hill, Miss M. E. Curme (Botanical).

July 19.—Boldre Church and Beaulieu Abbey, Col. E. B. Anderson, C.B.E., and Mr. H. A. Richey, B.A. (Archæological and Historical).

July 25.—Worbarrow Bay, Mr. Henry Bury, F.G.S. (Geological).

July 30.—Brockenhurst, Miss E. M. Ousby-Trew (Botanical).

Aug. 8.—Wool and Bovington, Miss S. Wetherell (Botanical and Entomological).

Aug. 16.—Worth Matravers and Winspit, Mr. H. J. Wadlow (Botanical).

Aug. 20.—Swanage, Mr. L. Beeching-Hall, F.L.S. (Botanical).

Aug. 22.—Badbury Rings and Gussage Cowdown, Mr. R. K. Cardew, B.A., and Col. E. B. Anderson, C.B.E. (Archæological and Historical).

Aug. 27.—Lyndhurst Road, Mr. J. Vorse (Botanical).

Aug. 28.—Office and Works of the Ordnance Survey, Southampton, Mr. Claude Lyon (Geographical).

Sept. 3.—Glastonbury, Mr. R. K. Cardew, B.A., and Col. E. B. Anderson, C.B.E. (Archæological and Historical).

Sept. 5.—Studland and Ballard Down, Mr. L. Beeching Hall, F.L.S. (Botanical).

Sept. 6.—Creech Barrow, Mr. H. Bury, F.G.S., and Mr. R. K. Cardew, B.A. (Geological).

Sept. 9.—Verwood, Major T. C. Moore, I.M.S. (Botanical).

Sept. 18.—Durweston, Mr. R. K. Cardew, B.A. (Botanical).

Sept. 23.—Wareham, Mr. H. J. Wadlow (Botanical).

The Council has much pleasure in announcing that Professor F. O. Bower, D.Sc., F.R.S., the President-elect of the British Association, has kindly consented to be nominated as the President of our Society for the coming year.

The great event of the past year has been the building of the New Lecture Hall; a full account of this will be found in this Volume, page 36.

The Foundation Stone of the New Lecture Hall was laid on the 8th of July, by Lady Morris, on behalf of Sir Daniel Morris, K.C.M.G., J.P.,Vice-President and three times President of the Society, who was regrettably absent through illness. There were about 100 members present. On behalf of the Society Mr. Claude Lyon presented Lady Morris with a silver trowel, in memory of the event.

The Caradoc and Severn Valley Field Club paid a week's visit to Bournemouth in June. The Council had much pleasure in making them Honorary Members of our Society during their stay, and helped them to organise their daily Excursions, and provided Leaders for some of the Excursions. Dr. Penrose also gave them a special Evening Lecture on "Local Birds." They afterwards expressed their deep gratitude for our kindly help and hospitality.

The members of the Zoological Photographic Club have conveyed, through Dr. Penrose, their thanks for the kindness of the Society in allowing them to use the Lecture Hall for their recent Lectures.

The Council reports with regret the deaths of the following members during the year:—Mr. Howard Lacey, a member for 10 years, formerly Chairman of the Botanical Section, and afterwards, until his death, Chairman of the Entomological Section, a valued and well-loved member of the Society; The Rev. W. H. Windle Cooper, an old and esteemed member of 20 years standing, who had given Lectures to the Society, presented books to the Library, and helped in other ways; Mr. C. H. Blackett, a member for 21 years, and who for 12 years had acted as Honorary Auditor to the Society; also Mr. Denton Scholes, Mrs. W. J. Foster, Mr. A. W. Waters, F.L.S., F.G.S.; Alderman J. J. Brazier, Mr. W. Child Clark, Mr. E. R. Gill, Mr. James Druitt, Sir Alexander Diack, K.C.I.E., C.V.O., C.B.E., and Sir E. Ray Lankester, K.C.B., M.A., LL.D., F.R.S., F.L.S., who was twice President of the Society.

The thanks of the Council are hereby tendered to the following ladies for their kind help with the Teas:—Miss Rooke, Miss Roden, Mrs. Rees Howell, Miss M. Wetherell, Miss McBean, Miss Ousby-Trew, the Misses Veale, and Miss Barratt; also to the following gentlemen for helping with the Lantern:—Surgeon-Captain Borrett, R.N., Messrs. Barratt, Dieselhorst, Dodshon, Lyon, Parrott, Wadlow, Whitaker and Williamson.

The thanks of the Society are also due to Miss Wetherell, Miss R. Harris, Mrs. Mattocks, and Messrs. White, Lyon, and Wadlow, for so kindly distributing the Volumes of Proceedings.

Since the last General Meeting no fewer than three Sections have lost their Chairmen:—The Astronomical, through the departure of Mr. Benny to Portsmouth; The Entomological, through the lamented death of Mr. Lacey; and the Physical, through the resignation of Dr. Crallan, after rendering invaluable service to the Section. The Council considers itself extremely fortunate in being able to announce that the following have kindly consented to be nominated to fill the respective vacancies:—Mr. J. Arthur Formoy, F.R.A.S.; Mr. Alan Druitt, F.E.S.; and Miss Marcia Penrose, B.Sc.

The Mill House Players gave a special performance of "The Yeomen of the Guard" in January, for the benefit of the funds for building the Lecture Hall, which resulted in the handsome gift of £31 8s. 8d. for which the Council gave their warmest thanks.

The Council is pleased to announce that the Mill House Players are giving a performance, next January, of "Iolanthe," in further aid of the funds of the Lecture Hall.

The New Forest Association recently passed a Resolution of which our Representative, Mr. Heywood Sumner, so strongly disapproved that he resigned his office as Representative. The Council approved of his action, and unanimously passed the following Resolution, sending copies of it to Lord Clinton, the Chairman of the Forestry Commission, and to the several local Field Societies:—"The Council of the B.N.S.S., representing over 600 members, all well acquainted with the New Forest, and keenly interested in its maintenance, wish to put on record their disapproval of the Resolution passed by the New Forest Association at their Meeting held on 30th October, 1928. They consider that no change in the Crown management of the New Forest, or in the policy which the Management has adopted, is necessary or advisable, and that any scheme giving to the Commoners additional power of any kind would be injurious to the free use and enjoyment of the New Forest by the Public."

A new feature of the Society's activities has been the introduction of what, for want of a better name, has for the present been called "Club Day." It is one day each month, set apart for Members to meet each other informally at No. 39 for conversation and general discussion with respect to matters about which they might wish to consult one another; and for general social intercourse of a possibly non-scientific character. So far it has been considered very successful.

A matter of minor but practical importance is that, at the recent raising of the Assessments, the Assessment of the Society's premises was raised from £104 to £163.

The winter frosts did considerable damage to the Society's House and Gardens; seven water pipes were burst, and a con-

siderable number of valuable Trees and Plants and Shrubs have died; others were severely injured, but may possibly recover. The Garden Committee venture to hope that individual Members may like to replace some of them.

The Exhibition of wild flowering plants at the Lansdowne Public Library, held from April to October, continues to be much appreciated, both by residents and visitors and also by students. The number of enquiries for identification of specimens increases each year, not only of British wild flowers, but of cultivated foreign species. The long-continued drought prevented the number shown being as large as usual, but many were of exceptional interest. The arrangements for the display were carried out by the Misses Rooke, Parton, S. Wetherell and Mr. H. J. Wadlow.

In conclusion, the Council sincerely thanks all who have given Lectures and conducted Excursions, and in any other way helped on the work of the Society.

The New Lecture Hall.

The idea of the Society's New Lecture Hall really dates from the time when the present premises were bought in 1919. It was then realised that no really adequate Hall could be provided in the building; to throw the Dining and Drawing rooms into one was a very inexpensive matter, but was looked upon as only a temporary solution of the problem in the difficult days at the end of the War. Ever since then the question of building a Hall has constantly been before the Council, and latterly members have frequently complained of the vitiated atmosphere, hardly mitigated by the addition of numerous ventilators. The root of the matter was the insufficient cubic capacity of the room, and it was clear that, if the Society was not to suffer loss of membership, the matter must be seriously taken in hand. A small Committee was appointed to go into the whole question, and finally recommended the building of a Hall to seat comfortably 200 people. They put forward a tentative plan, and suggested an appeal to members for their support. After the scheme had been thoroughly explained and discussed, the Council considered that they had sufficient support to proceed with the building. Definite authorisation was given at a Special General Meeting of members on March 7, and the contract with the builders was signed on June 3rd.

As the work proceeded, it was found that the proposed connection of the new Hall with the old building, as shown in the Plan in vol. XX of the Proceedings, would be very inconvenient. The Library, which it was hoped to retain, would be of little use, as much of the window would be blocked by the new building. It was decided to throw the room into the Entrance Hall by

means of an arch, and to make the above connection by way of the window. The result is a great improvement of the Entrance Hall and a very convenient access to the Lecture Hall from the old building. The main entrance for those attending lectures is round the east end of the building.

One great advantage anticipated was the provision of really comfortable chairs with plenty of room. It is a very difficult matter to please everyone in the choice of a chair, but after taking many opinions a pattern was at last selected, and 100 arm-chairs were provided. These were all very kindly given by members, a large number of them in memory of that most charming and lovable of Hon. Secretaries, Mr. R. A. de Paiva. A few more have been promised, but it was decided not to order any more until the verdict of members had been pronounced upon the present pattern.

A fireproof cinema room has been placed over the entrance doors, and it is hoped that before very long funds may allow of a cinematographic apparatus being installed, which will much add to the interest of lectures. The ordinary lantern will be worked from this room, and there is a permanent screen on the south wall.

A most important matter in a Lecture Hall is the acoustic properties. From our members we have had nothing but praise, and the general verdict has been that every word could be heard plainly in all parts of the room without undue effort on the part of the lecturer.

Experience has already taught us that one or two alterations in minor details will be necessary, such as the lighting of the Hall, and the heating of the cinema room.

The reconstruction of the ground floor of the house involves the conversion of the old lecture room into the Museum, and of the old Museum into the Library, changes which will be much appreciated by members. There is no change in the upper storey, where Archæological and Botanical exhibits are housed, and where there is the Dark Room, fully equipped for all kinds of photographic work.

The Entrance Hall, enlarged by the addition of the old Library, forms a Lounge, which it is hoped to make thoroughly comfortable. In the meantime the Reading Room and the Museum are available for members taking tea.

It is hoped that members who may wish to make suggestions as to adjustments or improvements, with the view to general comfort and convenience, will communicate with one of the executive officers for the information of the Council.

Summary of Accounts for the Year ending 30th September, 1929.

RECEIPTS.

	£	s.	d.
Current A/c			
Members' Subscriptions	503	12	6
Donations to General Fund	3	18	0
Sale of Proceedings of the Society	0	11	0
Sale of Natural History of Bournemouth ...	0	7	6
Rent from Tenants	130	0	0
Letting of Hall, etc.	3	18	6
Donations for Garden	2	15	0
Donation for Library	1	10	0
Donation for Lecture Expenses	4	17	4
Refund from Bournemouth Education Committee of Cost of Wild Flower Exhibition 1928	1	6	3
Surplus from Excursions	4	16	2
Sundry	0	5	0
	657	17	3
Balance from 1928	87	9	4
	£745	6	7

PAYMENTS.

	£	s.	d.	£	s.	d.
Interest on Debentures	185	10	0			
Less Tax	37	2	0			
				148	8	0
Income Tax under Schedule D ...				8	16	0
Maintenance of the Society's House:—						
Rates and Property Tax ...	78	18	6			
Water, Light and Heat ...	39	18	2			
Wages	73	0	0			
Insurances	9	12	0			
Share of Telephone	3	3	0			
Furnishing and Upkeep ...	14	14	2			
				219	5	10
Secretarial Expenses:—						
Printing and Stationery ...	42	15	9			
Postage	35	15	4			
Other Expenses	15	0	0			
				93	11	1
Maintenance of Garden:—						
Wages	24	16	0			
Other Expenses	1	6	0			
				26	2	0
Special Expenses of Library ...				11	19	8
Special Expenses of Lectures				14	1	4
Subscriptions to other Societies ...				2	3	6
Cost of Wild Flower Exhibition in 1928				1	6	3
Cost of Vol. XX. of Proceedings of the Society				66	17	11
Part Cost of Vol. XXI. of ditto ...				1	4	6
Sundries				2	7	2
				596	3	3
Balance carried forward				149	3	4
				£745	6	7

Summary of Accounts for the Year ending 30th September, 1929.

Deposit A/c. Debenture Fund.

	£ s. d.
Balance brought forward	81 12 10
Donations for Purchase of Chairs	51 0 0
Interest to Dec. 31st, 1928	1 17 10
	£134 10 8

	£ s. d.
Balance on deposit	134 10 8
	£134 10 8

Building Fund.

	£ s. d.
Balance brought forward	15 0 0
Donations	665 11 8
Re-issued Debentures	400 0 0
Interest to Dec. 31st, 1928	0 10 1
	£1,081 1 9

	£ s. d.
Paid to Builders on account	900 0 0
Balance on deposit	181 1 9
	£1,081 1 9

Archæological Research Fund.

	£ s. d.
Balance brought forward	15 4 8
Interest to Dec. 31st, 1928	0 6 2
	£15 10 10

	£ s. d.
Balance on Deposit	15 10 10
	£15 10 10

G. BRUMELL,
Hon. Treasurer,
1st October, 1929.

We have examined the above Account with the Books of the Society and Vouchers for payment and certify the same to be correct.

(Signed) BICKER & SON,
Incorporated Accountants.
F. BROAD,
Hon. Auditor.

Bournemouth,
18th October, 1929.

Report of Summer Excursions, 1929.

St. Oswald's Bay. Yet another example of the inexhaustible interest of the Dorset coast was afforded by an excursion on May 10th, under the leadership of Mr. St. John Burton. The cliff was reached at Dungy Head, a fine viewpoint from which the general character of the geological structure of the district could, with the aid of a diagrammatic sketch, be clearly determined. A conspicuous feature is the imposing chalk cliff of Hambury Tout, rising to a height of 454 feet, where, through earth movements in the Miocene period, the beds have been tilted up even beyond the vertical, under a pressure so enormous that the imbedded flints are either crushed or drawn out into stringy fragments. At the western end of the Bay similar powers at work on the Wealden and chalk beds, followed by erosion at the line of least resistance, have produced the natural arch known as Durdle Door, and greatly reduced the thickness of the beds, notably the Upper Purbeck. Still further west the Man-o'-War rocks are the surviving remnants of what in the remote past must have been a formidable rampart against the ravages of age-long marine erosion.

Cattistock. On May 25th a very noteworthy excursion was conducted by Mr. Cardew, embracing a flying visit to Melbury Park and a prolonged examination of Cattistock Church and its Belgian carillon. The bells and the lofty tower are due to the enthusiasm of a former wealthy Rector, backed up by the energy of the present incumbent. Of the chime of 35 bells, thirty-three were brought to England and placed in position in 1882, and the two smallest were added by the present Rector in 1899. The entire set was cast by the celebrated founder, van Aerschodt, of Louvain. The tower comprises four stages, the first being the ringing chamber, furnished with Seage's apparatus for dumb bell practice, and Ellacombe hammers for chiming for service. The next stage above is given up to the clock, which strikes the Cambridge Quarters, and also the hour on the tenor, a bell of nearly a ton weight. The third stage contains the eight bells forming the ordinary peal, while in the top stage we have the fixed carillon bells and the mechanical part for playing the tunes. This consists of a large steel cylinder or " tambour " 4ft. 2in. by 3ft. 6in., revolving on a horizontal axis, the surface pierced with 7,200 small square holes of $\frac{1}{4}$ inch diameter arranged in 120 horizontal rows round the circumference and each row containing 60 holes. Into these square holes shanked steel pins, with cammed points, are adjusted and kept in position by nuts inside the barrel. The pins are of graduated sizes, so as to provide for long, short or dotted notes and to secure the greatest accuracy of time. Above the axis of the cylinder are sixty steel levers with

steel nibs, which, being lifted by the pins as the barrel revolves, connect with the hammers by means of wires and so strike the bells. The 35 bells are supplied with 72 hammers fixed *outside* them. Three of the heavy bells have only one hammer apiece, while (since the same hammer cannot by mechanism be made to repeat very rapidly) many of those most frequently required are furnished with three, which can be used one following the other as quickly as is necessary. In ordinary English chimes we have a plain melody, sounded one note at a time, but with the carillon we have harmonised music with chords of 4, 5 or 6 bells. The whole arrangement suggests a glorified musical box, and of course the number of airs mechanically produced is limited. At Cattistock three airs follow in sequence hourly from 8 a.m. to 9 p.m. The machinery is controlled by a powerful fly of 4 brass fans and is operated from the clock in the chamber below.

Quite distinct in every way from the mechanical apparatus is the means for playing the bells by hand. The carilloneur performs as at an organ, by means of a keyboard of 35 wooden keys, 22 on the lower range and 13 semitones above. The keys connect, by means of wires, with clappers *inside* the bells, quite distinct from the hammers *outside* the bells, and used for this purpose only. In addition there are 11 wooden pedals, connecting with the larger bells.

With such elaborate mechanism it has only been found possible to change the tunes every two or three years, but an annual hand recital has been customary on the last Thursday in July, the performer being the celebrated Monsieur Denyn, of Malines, an absolute master of his art and a musician of consummate skill, or a qualified pupil from his school of carilloneurs.

Cattistock is not too difficult of access, either by train to Maiden Newton, a long mile from the village, or by direct road through Dorchester. A more interesting route had been arranged by Mr. Cardew by way of Blandford and Batcombe Hill, from which a glorious view is obtained over North Dorset and away to Mendip. The party was received most hospitably by the Rector, who very kindly placed his beautiful garden at our disposal, gave an address on the history of the church and the bells, and did all that was possible to make our visit interesting and campanologically instructive.

Barrington Court and Ilminster.

An interesting lecture, fully illustrated by excellent slides, was delivered on May 28th by Mr. E. Dodshon, by way of introduction to the corresponding excursion on June 8th.

Barrington Court is the largest Tudor house in Somerset; it was built between 1514 and 1520 by Lord Daubeney, and nothing better in English domestic architecture has been done before or since. The estate had a long and varied career before it was

rescued from sheer dilapidation by the munificent outlay of Colonel Lyle.

The chief name in the early history of the Barrington Estate is D'Aubigné, which became Daubeney, and the party stopped at South Petherton Church to see the fine tomb and brass of Sir Giles Daubeney who died 1445 (about 70 years before the erection of the Tudor building by his descendant, Lord Daubeney, Earl of Bridgwater); and at the same time they inspected the recently discovered chain mail effigy of an earlier Daubeney of about 1280; this was found in fair preservation three months ago four feet below the ground in a quarry at South Petherton; there is no record of how it came to be there. The shield bears the markings of the Daubeney family (4 fusils with 3 martlets for difference). This effigy has added to our knowledge of the evolution of mediæval armour; the collar of the mail is fitted behind the head, and over this is another piece which has two large tabs all of chain mail, to which tabs strings are attached; this fitting is distinctive and unique.

The party then proceeded through four miles of lanes and the pretty village of Shepton Beauchamp (the Norman family of Beauchamp were seated near) to the unspoilt village of Barrington. Lunch was taken on the lawn and in the picturesque and extensive walled flower gardens with lily ponds, and after it Colonel Sir A. A. Lyle's agent, Mr. R. W. Beacham, took the party through the interior of both the Tudor or Daubeney Mansion and the Strode or Stuart buildings, which latter were added by a member of the Strode family about 1670. The National Trust acquired the property by devise from Miss Woodward some years ago; for a number of years previously the property had been used as a farm house and was considerably dilapidated. In 1917 the estate was visited and inspected on behalf of the National Trust by the late Canon Rawnsley, secretary of the Trust, whose memory needs not the memorial in Crosthwaite Church; the fells of Borrowdale and the wooded shores of Derwentwater will be his monument as long as silver birches by Derwent renew their life and the English tongue shall last.

In 1919 the property was leased by the National Trust to Colonel Lyle on a 99 years building and repairing lease, subject to covenants giving certain rights of access to the public, and providing for approval of plans, etc. On adjoining property purchased by Colonel Lyle he has erected an agent's residence and extensive farm buildings.

The excellent woodwork and antiques with which the two houses are largely fitted and furnished were inspected by the party with interest, as were also many Tudor details in the Daubeney building, as, for example, the great open kitchen fireplace and a flue arrangement in the wall near by which was evidently used for keeping dishes warm. The two houses are now connected by a short corridor, and the whole block occupies as large an area as

the Bournemouth Pavilion. By the kindness of Colonel Lyle, members were allowed to take photographs and several members secured interesting negatives of the exterior and interior features of the two houses.

The party next drove to Ilminster, and were met at the church by the Vicar, the Rev. J. N. Boughton, M.A., who spoke on the history and archæological features of the church. including the fine Wadham tombs and brasses in the Wadham Chapel or north transept; two of the Wadhams founded Wadham College, Oxford, and alumni of this college have contributed generously during recent years to the £2,500 collected by the Vicar, who is a Pembroke (Oxford) man, for repairs in connection with the Wadham Chapel, the fine Somerset tower and other portions of the fabric. Members of the party had the advantage of an excellent view of the beautiful 15th century tower (built, like Barrington Court, of warm Ham Hill Stone) from the Vicarage garden. The reredos is excellent modern work of Beer Stone (a fine freestone, hardly distinguishable in colour, etc., from Caen stone); the Communion plate, which comprises two Elizabethan chalices, was also shown.

The out-journey through Sherborne and the return via Crewkerne made a very fine round.

Old Sarum. This subject has been pretty fully treated in volumes III. and V. of the " Proceedings " of the Society. The recent excursion on June 17th, under the leadership of Colonel E. B. Anderson, included a visit to the Salisbury Museum, where a large-scale model of Old Sarum, complete in every detail, constructed by the Curator, Mr. Frank Stevens, enabled him to illustrate and drive home the points of archæological interest which had formed the basis of Colonel Anderson's discourse *in situ* earlier in the day.

The Bournemouth and New Forest Plateaux. This excursion, on June 27th, was arranged by Mr. Henry Bury, to examine the Plateaux of Bournemouth and the New Forest. Stopping on Wallis Down, it was pointed out that there were large areas of flat and comparatively high ground lying between the Stour and the sea, which must be regarded as remnants of a large plain formed before the present valleys were excavated. This plain is everywhere covered with gravel, which rests on a planed-off surface of Eocene beds, and careful study of its constituents shows that it was deposited by two rivers: (1) the Stour, running at a much higher level than now, and in a wider channel; and (2) the Solent river, which, before the formation of Bournemouth Bay, extended the Frome to Spithead.

After visiting the Corfe Hills, which form the western end and highest part of the Bournemouth plateau, the party proceeded

by Wimborne and Ringwood to Picket Post, where they entered on the New Forest Plateau, which was followed for about nine miles to its highest point (over 400ft. above the sea) in Bramble Hill Walk. Here the leader discussed briefly the difficult problems of the age and mode of formation of these Hampshire plateaux. The late Mr. Clement Reid's theory of a double origin of the river Avon, with one part running to Southampton Water, was dismissed as entirely opposed to the evidence; but it is difficult to arrive at any positive conclusions except (1) that the plateaux must be an extremely old geographical feature, since the surrounding country has been denuded down to such a much lower level; and (2) that they owe their preservation to the protective influence of the gravel, which is absent from most of the lower ground. A neighbouring gravel pit was next examined, in which Mr. J. B. Calkin had recently found a sarsen stone bored by marine molluscs—an important proof of the invasion of the Hampshire Basin by the sea since Eocene times.

Boldre Church and Beaulieu Abbey. This excursion on July 19th was conducted by Colonel Anderson, who gave a most exhaustive architectural and historical account of Boldre Church, largely derived, as he told us, from a Lecture given by Mr. W. Ravenscroft, F.S.A., to the Hants Field Club (vide Proceedings, H.F.C., 1916).

The history of Beaulieu was effectively treated by Mr. H. A. Richey. The great Abbey was founded by King John, A.D. 1204, for 30 monks of the Cistercian Order, but the church was not consecrated till 1227; the cloister and conventual buildings were completed and the Abbey finally dedicated in 1246 in the presence of King Henry III. and his Queen Eleanor and a brilliant array of ecclesiastical dignitaries. The plan of the buildings is consistent with that of other monasteries of the Order. Comparison may be made with Netley Abbey,* itself an offshoot from Beaulieu in 1235. Netley fell a victim to the Order of Dissolution in 1536, and its last Abbot, Thomas Stevens, was in that year elected Abbot of Beaulieu. Two years later the Greater Monasteries met a similar fate, and the whole of the buildings of Beaulieu, except the Refectory and the Domus Conversorum, or house of the lay brethren, were destroyed by direct order of Henry VIII. Of these surviving relics, the latter has seen strange uses, as a school, a carpenter's shop, a lumber room; the former, converted into the Parish Church, has lancet windows and a well-preserved reader's pulpit, with a graceful arcaded approach in the thickness of the wall. At the north end of the Refectory is the cloister garth, on the east side of which still stand three beautiful arches which led into the chapter house. The property has been treated

* Vide "Proceedings" Bournemouth Natural Science Society, Vol. xx., Page 56.

with loving care by Lord Montagu of Beaulieu, a descendant of Thomas Wriothesley, the first Earl of Southampton, to whom the "lands, rights, privileges and immunities" formerly belonging to the Abbey were conveyed by Henry VIII. for a substantial consideration. The whole of the foundations can be traced, and each section of the original building is clearly labelled, so that the intelligent visitor may readily form a mental picture of the extent and grandeur of the Abbey in its glory.

Worbarrow Bay. On July 25th Mr. Henry Bury led the members of the Geological Section to Worbarrow Bay. During a brief halt at Corfe attention was called to the fact that the main geographical features of the Isle of Purbeck are two nearly parallel lines of hills, separated by a wide and fertile valley running east and west; and at Worbarrow Bay, in a section provided by nature, the dependence of these features on the geological structure is seen at a glance. The hill ranges are composed of hard limestones—Chalk to the north, and Purbeck and Portland stone to the south, while the intermediate valley consists of the soft sands and clays of the Greensand, Gault, and Wealden Beds. All the strata dip towards the north, and what we see before us is a mere remnant of a huge arch or "anticline," which once rose much higher, and extended further to the south; and the manner in which denudation, acting more rapidly on the soft strata than on the hard, had produced the present configuration of the ground was very clearly illustrated by a coloured diagram prepared by Mr. Bury. The formation of Worbarrow Bay was next discussed, and stress was laid on the important part played by the stream which now cuts through the Chalk ridge and reaches the sea at Arish Mell, but which must formerly have cut a valley through the Portland and Purbeck beds to the south; for it was by this latter valley (probably at a time when the land was sinking) that the sea first gained access to the soft Wealden strata, in which the Bay is mainly excavated. The deep cleft between Gad Cliff and Worbarrow Tout is also evidently a river-valley, and may safely be attributed to the stream which runs down from Tyneham; but the sea, in scooping out the Bay, has cut into this stream, and given it a more direct course to the ocean. Its old valley, however, can be traced immediately above Pondfield Cove, while the narrow ravine in which the stream now runs testifies unmistakably to the recent change in its level. It follows from all this that there must at one time have been two streams cutting through this southern line of hills within a few hundred yards of one another; just as there are two streams cutting through the northern line (Chalk) at Corfe; but this, though curious, is probably only a coincidence. That the former streams flowed south, however, while the Corfe streams flow north, is due to a curious shifting northwards of the watershed at the western end of the Isle of Purbeck.

A few characteristic fossils were noted in the Portland and Purbeck beds, and some large masses of fossil wood were found in the Wealden strata.

Creech Barrow. This excursion on September 6th, conducted by Mr. Henry Bury, embraced a special feature of interest in the Agglestone, which had not previously been visited officially by the Society. The Motor Ferry at Sandbanks has made access simpler, and it was found to be advantageous, in order to avoid the boggy heath on the east side, to drive through Studland and to follow the Corfe road to a high level from which an easy descent can be made to the Stone dryshod.

In appearance the Agglestone roughly resembles a huge toadstool, of which the stem consists of sandstone, protected from denudation by an overlying cap of locally-formed ironstone. A similar formation was inspected later in the day at Redcliff, a short mile below Wareham on the Frome river, where the sandstone cliff, largely composed of a curious breccia consisting of angular fragments of pink clay embedded in the sand, is protected by an extended sheet of ironstone like that of the Agglestone.

The term Creech Barrow is something of a misnomer, as archæologists have found no trace of interment, though a neighbouring hill bears unmistakable evidence of prehistoric settlement. Creech Barrow has been the subject of controversy among geologists. A conspicuous deposit of pipe-clay, now extensively worked as a commercial proposition, was thought to have extended over the top of the hill and to have been removed by denudation; it is now clear that the clay extends under the hill and must therefore be of more recent origin. It was the late Dr. Hudleston who first discovered that Creech Barrow is capped by a hard limestone, and the somewhat imperfect fossils found in it make it practically certain that it is of oligocene age. If so it is the only example of that age in Dorset, and is separated by more than twenty miles from the Hampshire beds of the same date.

Bradford-on-Avon. Seventeen years have elapsed since the Society's former visit to this picturesque old town. It has suffered but little change or modernization in the interval, and a fairly complete account of its many attractions may be found in Vol. IV. of our Proceedings. The journey by road may now be accomplished in three hours, and a similar time given to the tour of the town as arranged by Dr. Snell, the leader of the day, on September 11th. This embraced the Tithe Barn at Barton Farm, the noble Jacobean Kingston Hall and the two churches of the Holy Trinity and St. Lawrence. The latter is the glory of the town, as the only complete church of Saxon architecture, the most

ancient unaltered church in England. For generations it existed unsuspected, hemmed in on the south side by a clutter of mean buildings, and degraded to use partly as a gardener's cottage and partly as a school. Its romantic discovery by Canon Jones in 1856 led to its careful restoration as a place of worship. Though it probably occupies the site of the *ecclesiola* of St. Aldhelm who died in 709, it is thought to date from the close of the 10th century, and colour is given to this theory by the early example of church carving of that period in the form of two sculptured angels over the chancel arch, and also by the double-splayed windows and the nature of the external arcading.

The time at the disposal of the party proved all too short, so that only one energetic pilgrim made the ascent of Well-Path Hill to White Horse Terrace, one of a series of parallel terraces of houses on the hill-side, approached and connected by a maze of cobbled footways and steep steps. Diligent search discovered the Tory Chapel, a small Perp. building restored in 1870, once a "hospitium," complete with chapel, refectory and chamber, now, as to the east-end a chapel, and as to the west-end a minute dwelling house, but all under lock, and, at the moment, untenanted, so that detailed internal examination must be postponed till a future visit.

Durweston. A glimpse of the more recondite beauty of Dorset was afforded by an excursion planned and carried out by Mr. Cardew on Sept. 18th. Express trains dropped and picked up the party at Durweston Halt; thence by footways through the village, up a gentle slope, through the woods, and so to the crest of the downs, some 300 feet above sea-level; along the ridge, by a deep combe, and down another valley to the starting point; altogether a round of about four miles, quite fascinating and hitherto unexplored. Botanists were busy and recorded, among a wealth of material, milk thistle (*Lilybum marianum*), dewberry (*Rubus caesius*), orange balsam (*Impatiens fulva*), clustered bell-flower (*Campanula glomerata*), herb paris (*Paris quadrifolia*).

There was time also to inspect the church, mostly re-built, with the exception of a fine Perp. embattled tower with niches. Inside, over the south porch, is a curious piece of sculpture, representing Saint Leger, the patron saint of blacksmiths, displaying his miraculous power. He is arrayed in a cope, and holds the smith's hammer in one hand, in the other the foot of a horse, which for his greater convenience, he has detached from the animal. The anvil, which occupies the centre of the group, is flanked by the figure of a knight with a three-legged steed awaiting the completion of the work.

This quaint relic was transported to its present position from another church which formerly existed in the close vicinity.

The Rector, unavoidably absent, had very kindly arranged

hospitable entertainment for the party in a charming house and garden.

South Petherton and Crewkerne. On September 28th yet another excursion into Somerset was conducted by Mr. Dodshon, with a very large following, the objective being a string of villages along the highway from Sherborne towards Taunton. Immediately after clearing the suburbs of Yeovil a glance to the right reveals what proved to be a great stone tithe-barn, transeptal in form and heavily buttressed, and contiguous to it the interesting manor house of Preston Plucknett, of which the most striking features are a fine two-storied porch, and a rare example of a " Louvre " chimney, in three tiers, and in good preservation, if slightly marred by recent strengthening brickwork.

Passing on between the great house " Montacute " and the hill (Mons), which has given its name to the picturesque village, the next halting-place was Stoke-under-Ham. Ham Hill, which towers above the village, is topped by a cenotaph, an object of pilgrimage to the villagers, who have furnished the steep slope with scattered benches. Ham Hill stone is a famous building material, though the quarries are not now so heavily worked as aforetime. The débris of workings have somewhat disfigured the ridge, but in a very few minutes they may be left behind, and it is easy to trace the line of an ancient camp, some 2½ miles in circumference, with immense vallums and fosse encircling the long spur of the hill. A prehistoric work, no doubt, adapted by Roman settlers, of whose occupation evidence has been brought to light by the recent excavation of a Roman villa.

Down in the village is the " Parsonage Farm," once, it is thought, a Chantry house of the 15th century, with a fine Gothic gateway, a bellcote, and a columbarium with massive buttresses, the upper part of the walls lately restored by Somerset archæologists, though the conical stone roof has disappeared. Three miles further west, after crossing the Fosse Way, came the crowning feature of the day, known as King Ina's Palace. This royal connection is, however, definitely disclaimed by the owner, Mr. de Havilland Hoskyns, himself an archæologist, content with the more modest title of South Petherton Manor. There is certainly no trace of architecture of a very remote period, the chief feature of the house being a beautiful two-storey bay, with Gothic windows, the lower stage enriched with a row of shields, and dating not earlier than 15th century. Perfect freedom was granted to the party to ramble at will over the whole of the house, which contains a vast amount of magnificent wood carving, and about the grounds, adorned with good specimens of topiary work, and with many noble trees.

Turning south, a short drive brought the party to Crewkerne and its great church, of which the most notable features are an

KING INA'S PALACE.

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amazing array of gargoyles, including a series over the south porch " representing an amateur orchestra," and a unique recess on the outer south-east angle of the south transept. It measures 8ft. high by 3ft. wide, and contains a ledge or seat with a shallow niche above. This may have been the cell of an anchorite, for the existence of which, somewhere in the churchyard, there is documentary evidence, or, perhaps equally probably, an external shrine, with a figure in the niche and the ledge for votive offerings.

A rapid run home in less than two hours brought to an end a most interesting and crowded day, which had been, however, so carefully planned that everything was carried out quite comfortably and without any suspicion of indecent haste.

Report of the Botanical Section.

The botanical section held 30 meetings, comprising eight afternoon lectures and addresses, one " At Home " and 21 excursions. At the meetings held at 4.30 p.m., there were informal discussions extending over a wide range of subjects of botanical interest, frequently illustrated by members' specimens, photographs and lantern slides. The excursions were well attended and included various tracts of country not previously visited by the Society. Thanks are due to leaders of excursions who explored new routes in advance, resulting in walks of special interest.

Notes on Local Plants, 1929.

By L. Beeching Hall, F.L.S.

LOTUS TENUIS. *W. & K.* This plant has been recorded for a few localities in the district, and this year has been noted in considerable quantity in a limited area near Milford-on-Sea. It is probably often overlooked owing to its close resemblance to the common Lotus corniculatus (Bird's-Foot Trefoil). In Lotus tenuis the leaves are distinctly narrower, the flowers are usually smaller and fewer on each peduncle, and in the wings of the corolla the lower margin curves upward nearer the end than in the common species. Although these two are apparently closely related, the differences have remained constant in cultivation.

LOTUS HISPIDUS. *Desf.* This rare plant has long been known near Hengistbury Head. In 1926 I found it in a new locality near Southbourne, on ground which had been made up with gravel in preparation for building. Here the plants were in great profusion and of remarkable size. Many had stems over thirty inches long, spreading in all directions, and some measured over four feet across. The usual length of stem is between three and nine inches. This year (1929) this colony had almost disappeared and the few remaining plants were very much smaller, owing to competitive growth of more aggressive species, particularly Agrostis alba. This summer I found the species in a new locality at Parkstone.

CORONILLA VARIA *L.* A few years ago this plant appeared on waste ground near Christchurch, with numerous other aliens. Many of these have disappeared owing to displacement by native species, but the Coronilla has increased and now forms large patches, some with white flowers.

SOLANUM NIGRUM *L. var.* LUTEO-VIRESCENS. *Gmel.* In this rare form of the common Black Nightshade the ripe berries, instead of the usual black, are greenish yellow. For many years it has been found at different times and places in this district, often suddenly appearing in some quantity and as quickly disappearing. In 1927 I found a small colony near Sandbanks, and this year Captain Borrett has discovered a number of very large and robust plants near Westbourne. Both these localities are additions to Linton's Flora of Bournemouth. All records of this plant are wanted.

CHENOPODIUM POLYSPERMUM. *L. var.* CYMOSUM *Moq.* This interesting and well marked variety is not recorded in Linton's Flora or supplements. This year I have found it near Burley, New Forest. It differs from the type by having obtuse leaves, decumbent stems, and flowers in much branched roundish clusters which are shorter than their adjacent leaves.

CHENOPODIUM HYBRIDUM *L.* In Britain this plant has been recorded for only 31 of the 112 Watsonian divisions. In the Bournemouth district it is rare. In 1926 a large patch was growing near the North Bridge at Wareham, where it has since been entirely destroyed by building. This year a few plants were growing near Wareham Station. Both these are new localities. This plant is uncertain in its occurrence, often appearing for a short time only in any one station. It should be looked for in waste or cultivated ground. It cannot easily be confused with most of the eight other species of the genus which are found in this district. From its nearest allies it can usually be separated by its leaves, which are sub-cordate, with two to four sharp teeth on each side, and by the seeds, which have no keel and have the surface dull and coarsely pitted.

RUMEX MARITIMUS *L.* (The Golden Dock). In Linton's Flora of Bournemouth this plant is marked " extinct?" Two records are given, one for Poole and one near Wareham, followed by the note " Both are old records, not confirmed in recent years." This year I have found specimens of this rare Dock at Parkstone, which reinstates the species in our local flora.

RUMEX SANGUINEUS *L.* (The Blood-veined Dock). The variety viridis (*Sibth.*) of this plant is very common in our district, as elsewhere, but Linton in his Flora of Bournemouth says " type absent." This plant must now be added to our list. In 1926 I found near Wareham a colony of fifteen plants of the type. R. sanguineus has sometimes been confused with the var. viridis as in this the midrib of the leaves sometimes turns red in autumn. In sanguineus the midrib and the main lateral veins of the leaves are a brilliant crimson from the first, and the colouring is particularly vivid in the young radicle leaves. A plant that has often

been wrongly reported as sanguineus is Rumex obtusifolius, var. purpureus *Peterm.* which has red veins in the leaves, but may be readily separated by the conspicuous teeth on the enlarged sepals, which are entire in sanguineus. I have grown sanguineus for some years and find that it keeps true to type, which I believe is the usual experience.

JUNCUS MARITIMUS *Lam.* VAR. CONGESTUS *L.B.H.* This new variety was described in last year's proceedings of the B.N.S.S. on p. 60, and in the Journal of Botany for December, 1928. This year the original five clumps on Studland Heath have produced fewer flowering heads, but they are otherwise all exactly as in 1927 and 1928. All the flowering heads on these roots are again the compacted form. Careful search among the large colonies of the species which occur commonly in the district has hitherto failed to reveal any other plants of this well marked variety.

POLYPOGON MONSPELIENSIS *Desf.* This rare and beautiful grass has been known for many years on Studland Heath, where it has usually been growing in almost bare sand, in small quantity, and very poorly developed. This year a large part of the marshy ground on the heath, which as far as I can ascertain has previously always been submerged, has been entirely free from surface water. This has resulted in a considerable change in the flora. The former marsh has been invaded by large numbers of plants from the dryer ground. Among these was a considerable number of the Polypogon, tall and well developed, very different in appearance from the original colony. This is the only recorded locality for the plant in our district. In recent years it has seemed in danger of extinction, but the changed conditions have enabled it greatly to extend its range and vigour.

CYNODON DACTYLON *Pers.* (Dog's Tooth Grass). This curious grass is of special interest. It is not only one of our local rarities but is recorded from three only of the 112 British vice-counties. In India, where it is abundant, it is known as Doorba or Dhub, and is there one of the best pasture grasses. Hitherto the only recorded stations in the Bournemouth district have been the two given in Linton's Flora, but I am now able to add three new localities, namely Sandbanks, the South side of Poole Harbour, and in Bournemouth, between the two piers.

GLYCERIA RETROFLEXA. An interesting addition has been made to the British Flora, as well as to our local list by Mr. C. E. Salmon, who has found that among some Glycerias which he gathered with me near Wareham, are specimens of G. retroflexa. Although not previously recorded for Britain, Mr. Salmon has found that specimens from several other localities have been preserved in herbaria and placed under G. distans, which it closely

resembles. The following are characters by which retroflexa may be distinguished: upper glume narrow and acute; lower glume narrower and longer that in distans; spikelets more tapering and with flowers placed further apart; panicle branches thicker and more spreading and deflexed. All records of this plant are wanted.

BROMUS BRITANNICUS *I. A. Williams.* The discovery of a British plant new to Science is now a rare event. This grass was first described as a new species in the Journal of Botany for March, 1929, by its discoverer, Mr. I. A. Williams. In June I found a few plants near the Lizard, Cornwall. In August Mr. Williams found it near Lymington, Hampshire. I have looked for it with him elsewhere in the district but hitherto without success, but Mr. Salmon tells me he has found specimens among some grasses gathered by him in Dorset some time ago. In various collections from different parts of the country this grass has been found included as other species. In appearance it most nearly resembles hordeaceus and brachystachys, and might be passed for secalinus. The following points will assist those who desire to search for this new grass: general appearance like a slender hordeaceus but with spikelets normally shorter by a third or half; spikelets usually solitary; mature florets not closely imbricated and with diverging awns; panicle usually contracted and with branches mostly as long as the spikelets; lower pale with very sharp, narrow, somewhat diverging points; upper pale much shorter than seed and with marginal bristles to about two thirds from base; mature seed as long as or slightly shorter than lower pale and with an apical tuft of whitish hairs, easily visible between the points of the lower pale. I have raised a batch of plants from seed and next year hope to report if any of the above characters vary under different conditions.

A Rambler's Note.

For many there is no deeper satisfaction than that which comes when the open country lies before us and we are free to wander over wide sunlit spaces. Time is forgotten. Care is cast aside. The stream of consciousness moves in observant tranquillity, reflecting something of a peace beyond word capture.

Here on every hand is the silent multitude of the plants, weaving their living tapestry of changeful harmonies across the valley to the distant rim of the hills. Here they stand as did their ancestors ages before man, and here are some that themselves have witnessed a long sequence of follies called History.

Many are content to pass among these living things regard-

ing them merely as a multitude.—a mosaic of colour,—a background to their musing. Others greet them as individuals; seek to know them; enquire upon their history; ask from each what it can tell of the mysteries of life. They find every one with its degree of fitness and beauty; the smallest with its problems touching the very foundations of our being.

Some there are whose appeal is immediate,—a flood of blue in the dappled sunlight of the springtime woodland,—wide-flung purple of the autumn moor. Others reveal themselves to the lens. Without this aid who could imagine the glowing perfection of the Pimpernel, the gleaming amber bosses on the Bog Myrtle? There are yet many others that may be known only by way of patient enquiry, and by toil that merges into pleasure. This is among the things that are worth while—to widen the circle of our friends among these our fellow sojourners. So may the seeming waste reveal itself a garden and the wilderness a place of greeting.

L.B.H.

Diatoms.

In the study of nature one is increasingly impressed by the vast range of beauty in form and colour that, until yesterday in world history, was hidden from man, and most of which is still unrealised by those who have not studied nature at first hand.

As we explore the new world that was revealed by the microscope the mind is almost overwhelmed by the enormous variety of minute living things. Among these there are few groups so well worth study as the Diatoms. They are decidedly the most important of marine plants. On land the grasses come first in the support of animal life, but even more important are the Diatoms as a basis of life in the water.

As the green plants on land, so these minute plants in the sea, by means of their modified chlorophyll, are able to build up, from comparatively simple inorganic materials, the intricate organic substances upon which animal life depends for food. They form the first link of a long chain of marine life. A hundred could easily find room on the head of a pin, but their vast numbers make up for their small size. They form the meadows of the sea.

A book entitled " Notes on Diatoms "* has been written by our member Mr. F. B. Taylor, in which these fascinating and useful organisms are described in a manner which cannot fail to appeal to nature students. The book is based on notes

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(**Notes on Diatoms, by Frederick Beatson Taylor, B.A., of King's College, Cambridge,* 1929. *Obtainable from the author at 2a, Montague Road, Bournemouth.*)

which were originally compiled by the author for his personal use, but have now been published in the hope of assisting others by giving them the result of twenty years' work. In addition to an account of first hand study, the book contains a very large number of notes from books and periodicals, now out of print and to be found in very few libraries. It gives in a remarkably clear and attractive manner as complete an account as could well be compressed into the space available. There are chapters on the manner of growth, structure, and power of movement, and special attention is given to geographical distribution. For those who desire to take up the practical study there is a chapter on the literature, showing the beginner how he may start a library at a moderate cost, and including a list of the principal authors and their work. A glossary is added giving the derivation of the generic names. The printing and style of the volume is excellent. In these days of so much dilute verbosity which is published as popular science this book is a model of compactness and clarity.

L.B.H.

Report of the Zoological Section.

Summary of Observations on Birds, etc., from October, 1928, to October, 1929.

During the past thirteen months an exceptionally large number of rare or unusual birds have been seen or heard. This is due, probably, to the severe conditions in the later winter months.

For many years there have not been so many Brent Geese (*Branta b. bernicla,* L.) seen along the South Coast as there were during February, 1929, and even as late as March 5th there were hundreds of them in Poole Harbour; also there were a great many waders of various species frequenting the harbour. This may be due to their being less persecuted by gunners than in previous years, also there being one or two competent observers watching their movements throughout the seasons. On the other hand there is a definite diminution of the number of birds frequenting the sea in the bay between the Needles and Durleston Head, such as Guillemots and Razor Bills, Divers, Scoters and other sea ducks. This is almost certainly due to the refuse from oil-burning steamers. I have been told that the stench from the decaying bodies of the victims has at times been very perceptible along the shore between Mudeford and Chewton Bunny.

The following notes are abstracted from those sent me by the observers named and from my own :—

From MR. EDWARD BROWN.

1929, February. Redwings in his garden. During the summer he feels confident that Little Owls (*Athene noctua vidalii,* A. E. Brehm) brought up a family in a tree in the grounds of Grovely Manor School.

October 27th. Crossbill (*Loxia c. curvirostra,* L.), at 2.30 p.m., visibility being perfect, three of these birds were seen and watched for a quarter of an hour feeding on two low Scots firs in Stourwood Avenue; two birds were red; and it is believed that one or two others were close at hand. At one time the green bird appeared to be being fed by one of the others or else they were "toying" together; a certain amount of jealousy seemed to exist and now and again one would fly to another and take the cone away.

From MISS DOROTHY COOKE.

A list of 97 species identified between January and September, 1929. The most noteworthy was a Black-throated Diver (*Colymbus a. arcticus,* L.) seen on January 12th from Hengistbury Head.

As she does not record either the Great Northern (*Colymbus immer,* Brünn.) or the Red-throated Diver (*Colymbus stellatus*, Pontopp.) in her list, she was very fortunate (assuming the identification is correct) to see the species which is a much less frequent visitor to our coast than either of the others.

From the REV. F. C. R. JOURDAIN.

Raven (*Corvus c. corax*). Besides the few pairs breeding on the Dorset coast, Mr. J. F. X. Wynne reports that there are now three pairs nesting on the Isle of Wight.

Golden Oriole (*Oriolus o. oriolus*). One seen on Sandown Golf Links, Isle of Wight, by Mr. J. E. H. Terry on June 14, 1929.

Crossbill (*Loxia c. curvirostra*). Probably partly on account of the immigration of 1929, Crossbills have been numerous in the Southbourne district since July. Mr. Wynne reports a flock of about 20 seen at Shanklin on June 28 (*Brit. B.* xxiii. 102). Breeding took place in Dorset not only in 1928 but also in the same locality in 1911.

Firecrest (*Regulus i. ignicapillus*). Mr. F. Primrose Stevenson, of Southbourne, reports two Firecrests repeatedly seen in his garden for some five or six weeks in late December, 1928, and January, 1929.

Black Redstart (*Phoenicurus och. gibraltariensis*). One was reported by Mr. Hamlin from Weymouth in February, 1929, and Mr. R. L. Vernon saw a male at Bembridge, Isle of Wight, on February 13th 1929 (Cf. *Field*, February 21st). I believe the Rev. F. L. Blathwayt saw another at Weymouth on March 7th.

Grasshopper Warblers (*Locustella n. naevia*) were numerous in Dorset and S. Hants during the summer of 1929. One nest which I saw was in a sandy spot among stunted heather only a few inches high, and much exposed.

Buzzard (*Buteo b. buteo*). It is said that the pair of Buzzards which has bred in the New Forest for many years past has come to an untimely end. As we have no cliff-building birds in either Hants or Dorset, the loss of these birds is much to be deplored.

Bittern (*Botaurus s. stellaris*). Mr. A. Blinn informs me that a Bittern haunted the Backwater at Weymouth for about two months up to the beginning of March, 1929.

Dark-breasted and Light-breasted Brent (*Branta b. bernicla* and *B. b. hrota*). The Hants and Dorset coasts were visited by great numbers of Brent during the cold spell of early 1929, but the two races both occurred and records do not always discriminate between the two. Flocks of 200 to 300 were seen close in shore at Weymouth. A head and some breast feathers sent to me on March 11th were undoubtedly of the Siberian (dark-breasted) form. A dead bird, picked up by Miss C. Popham on

Hengistbury Head on February 22nd, was also of the same race; Mr. Wynne saw a flock of 20 or 30 between Ryde and Wootton on February 8, and on March 3 at Keyhaven I saw two lots (of 8 and 12) which were undoubtedly the Light-breasted or Spitsbergen form.

Garganey (*Anas querquedula*). Although there is little doubt that this species has bred on previous occasions in Dorset, absolute proof has hitherto been lacking. During the present season drakes have been observed at three localities in the county, and one was repeatedly seen on Lodmoor near Weymouth by many observers, including Mr. Blinn, the Revs. C. J. Pring and F. L. Blathwayt and myself. No nest was found till June 6th, when Mr. A. Blinn flushed a duck from a clutch of 9 eggs. Samples of the down and eggs were quite typical (Cf. *Brit. B.* xxiii. 99).

Eider (*Somateria m. mollissima*). On March 3rd Miss C. Popham and Miss E. Walsh watched a male Eider, accompanied by two females or immature birds, feeding at sea off Hengistbury Head and waited on by two Herring Gulls (Cf. *Brit. B.* xxii. 327).

Sanderling (*Crocethia alba*). Mr. Wynne reports a pair feeding on Shanklin shore with Gulls on February 12th, 1929.

Black Tern (*Chlidonias niger*). Mr. N. Y. Tessier saw on May 3rd, 1928, a Black Tern near Skidmore on the River Test, hawking up and down the river.

From MISS ROOKE.

Two House Martins (*Delichon u. urbica,* L.) were flying round the highest gable for several days, and on June 10th commenced the nest. About 15th July, two young birds were hatched and fed by their parents; later, when the first brood had flown, the nest was empty for a time; then five flew round for ten days, and eggs were laid; these were hatched about August 20th; from that date they were continuously fed by five birds. On September 18th the nest was carefully examined by a workman painting the house, and was found to contain three fledged birds of extra large size; the nest had evidently been enlarged after the first brood. A clearly-seen part of the end opening had been broken away, so that the three could be well seen arranged along the opening waiting for food. On the evening of September 24th all was usual, a constant twittering going on until 11.30; at 8 a.m. on the 25th they had all disappeared and from that time no birds have been seen, though careful watch was kept.

From an account in the " Daily Echo " by Mr. W. J. Day, it appears that a huge gathering of swallows was seen before 9 a.m. on Friday, September 25th, at Neacroft Green, so apparently the House Martins joined them on that date. Is it the usual course for the first brood to assist continually in feeding the second? is a question Miss Rooke asks.

From MY OWN DIARY.

1928.

Oct. 2.—A bunch of Knot (*Calidris c. canutus,* L.) seen at Red Horn, Poole Harbour. Also some Wigeon (*Anas penelope*, L.).

Oct. 10.—Chiffchaff (*Phylloscopus c. collybita*, Vieill.) singing in the garden. A Greenshank (*Tringa nebularia,* Gunn) seen with Dr. and Mrs. A. C. Coles at Salterns, Poole Harbour.

Oct. 15.—A Diver (*Colymbus*), species uncertain, seen in the Bay for the first time this autumn.

Oct. 23.—A small flight of Swallows (*Hirundo r. rustica,* L.) going westwards, the last seen during the year.

Oct. 25.—A Clouded Yellow Butterfly (*Colias edusa*) in the garden.

November.—Towards the end of the month a spell of cold weather set in.

Nov. 25.—A considerable flight of Jackdaws (*Colæus monedula spermologus,* Vieill.), and small birds, many of these being Linnets (*Carduelis c. cannabina*, L.), passed westwards.

Nov. 27.—Two Rock Pipits (*Anthus spinoletta petrosus*, Mont.) feeding on the lawn.

1929.

Jan. 13.—Redwings (*Turdus musicus*, L.) in the Public Gardens.

Jan. 14.—Fieldfares (*Turdus pilaris*, L.) in the garden.

Jan. 21.—A Red Squirrel (*Sciurus vulgaris*, L.) seen in Branksome Wood.

February.—From the 11th to the 20th of the month the weather was very severe.

Feb. 16.—Several Redwings (*Turdus musicus,* L.) passed along the East Cliff and a Fieldfare (*Turdus pilaris,* L.) settled in a tree on the lawn.

Feb. 17.—A long skein of Wild Geese flew past the East Cliff heading eastwards.

Feb. 27.—A Peewit (*Vanellus vanellus,* L.) alighted and fed on the lawn.

Mar. 5.—A Peewit, probably the same bird again, on the lawn. Some hundreds of Brent Geese (*Branta b. bernicla*, L.), both dark and light-breasted forms, as well as many waders of various species, feeding in Poole Harbour to the eastward of the main channel between Brownsea Island and the East Looe Bay.

Mar. 8 to 15.—The second week in March was bright and sunny. On the 8th a small Tortoiseshell Butterfly (*Vanessa urticæ*, L.) on the wing, and on the next day two Brimstone Butterflies (*Gonepteryx rhamni*, L.) were on the wing along the East Cliff, and on the 11th many more were seen in the meadows along the

Avon at Hurn, where the cock Peewits were indulging in their spring flight, and the Snipe (*Capella g. gallinago*, L.) were drumming.

Mar. 20.—A cock Black Redstart (*Phœnicurus och. gibraltariensis*, Gm.) settled on the bird-bath in the front garden.

April 5.—Apparently the arrival of spring migrants was rather late as the first Wheatears (*Aenanthe ae. aenanthe*, L.) to be seen this year were reported to me on this date.

April 7.—The first Swallow (*Hirundo r. rustica*, L.) seen.

On April 9th and 10th.—Dr. A. C. Coles saw a female Golden Oriole (*Oriolus o. oriolus*, L.) near Iford on the Stour.

April 11.—Many Swallows, Martins (*Delichon u. urbica*, L.), and Sand Martins (*Riparia r. riparia*, L.) were seen around the Priory at Christchurch.

April 13.—First Blackcap (*Sylvia a. atricapilla*, L.) heard singing in the garden.

April 18.—During the night of April 17/18 there was a great arrival of small warblers.

April 19.—Cuckoo (*Cuculus c. canorus*, L.) heard in the New Forest, and Dr. A. C. Coles reported the arrival in Poole Harbour of 3 or 4 Whimbrel (*Numenius p. phæopus*, L.).

During April several rare visitors—Golden Orioles and Hoopoes (*Upupa e. epops*, L.) were reported from the coastal districts of West Dorset, but beyond the limits of the area marked in our Handbook.

May 1.—Swifts (*Apus a. apus*, L.) flying over the Stour at Throop.

May 15.—In the "Daily Echo" there was a letter from Mr. M. I. Mansfield reporting the presence of a small flock of Bee-eaters (*Merops apiaster*, L. ?) "flying round Charminster School and perching on an aerial near our windows" on Sunday, May 12th.

June and July.—During the summer Great Spotted Woodpeckers (*Dryobates major anglicus*, Hart) reared a family, the nest being in the dead trunk of a birch tree in St. Peter's Churchyard.

Aug., Sept. and Oct.—At the end of July and throughout August and September there were several Crossbills (*Loxia c. curvirostra*, L.) about, many of them in the brilliant adult pink and scarlet pink plumage.

Sept. 23.—Dr. Coles showed me three Greenshanks (*Tringa nebularia*, Gunn) at Salterns, Poole Harbour, and these or others were to be seen there off and on for about six weeks.

F.G.P.

Library Report.

Since the last Report the old Library has been done away with, and the books have been removed to the room that used to be the Museum. This is a larger, lighter and more convenient room. While the alterations to the main building were being carried out it was necessary to close the Library, and it remained closed until the 1st of November. The new Library has been renovated and fitted with many new shelves. The books have been re-arranged, and it is hoped that the present arrangement will meet with the approval of the members.

A number of old books, pamphlets, monthly or annual reports and other publications have been stored in an attic, where they will be available to anyone who wishes to consult them.

In the re-arrangement of the books, etc., the Hon. Librarian has been greatly helped by Mr. Whitaker and Mr. Broad, and he wishes to place on record his thanks for their willing assistance. He would like also to thank Miss Alice Veale, the Assistant Librarian, for all the work she has done for the Library.

Books, pamphlets and monthly publications have been received from, or subscribed for by, the following members and others :—

Mr. H. Backhouse
Mr. St. John Burton
Mr. Henry Bury
Dr. Crallan
Dr. Hurry
The late Mr. Lacey
Mrs. Linton
Mr. Lyon
Miss Moss
Miss de Paiva
Dr. Penrose
Miss Frances Penrose
Mr. G. B. Scott
Mr. Sherring
Mr. F. B. Taylor
The late Mr. A. W. Waters
Mrs. Waters

New Books added :—

Wessex from the Air, by Crawford and Keiller.
Romance of the Apothecaries' Garden at Chelsea, by F. D. Drewitt.
The Haunts of Life, by J. A. Thompson.
Footprints of Early Man, by D. Mackenzie.
Supplement to Townsend's Flora of Hampshire, by Rayner.

Periodicals, purchased or given :—

British Museum Quarterly.
Antiquity.
The Journal of Botany.
Nature.
The National Geographic Magazine.
The Realist.

Museum Report.

During the building of the Lecture Hall it was found necessary to pack away most of the exhibits, so that no sorting or classification could be done. The specimens have now all been moved into the old Lecture Hall, which will for the future be the Museum, and the arrangement of the room is proceeding as quickly as possible. No additions of any importance have been made during the year.

The attention of members is called to the Archæological and Botanical Rooms, on the first floor, which are not used by members as frequently as could be wished.

An Abstract
OF
The Presidential Address
SATURDAY, OCTOBER 26th, 1929.

By Professor F. O. Bower, D.Sc., F.R.S.

Up to 1870 the botanical world had been content to discuss structure objectively, observing the facts that exist, rather than putting upon them any mechanical interpretation. The first treatise which was devoted to analysis of plant structure as an engineer might treat an engine, a ship, or a building, was produced by Professor Schwendener in Berlin about 1876. Since then the subject has become part of the stock-in-trade of Botanical Science.

A proper understanding of the problems that face an enlarging plant is best approached by contrasting the scheme of the animal with that of the plant as regards mobility and nutrition. Animals are dynamic organisms, retaining for the most part their mobility; but dependent for their nutrition ultimately upon the kingdom of Plants. They do not construct for themselves, and, as their waste rises with size in a high ratio, they are essentially *expenders*. Plants, on the other hand, are static, at least in all their higher forms. Their self-nutrition accords with the stationary habit, while they are essentially *accumulators*, their waste being comparatively low. These facts lead naturally to their continued embryology, and the indefinite scheme upon which their body is constructed. Each apical bud can produce a sequence of leaves which is theoretically unlimited; and as in the higher plants a bud appears in the axil of each vegetative leaf, provision is made for an ever-extending plant body, with branching on so high a scale that its full realisation is practically impossible. The mechanical problem, then, is to maintain the form of an indefinitely enlarging body, in resistance to gravity, the impact of winds, and other external circumstances.

The first step is by *encystment* of the soft protoplast by a cell-wall deposited around it. Simple examples of this are seen in many unicellular algæ. Such encysted cells, originating from the embryo by cell division, form the structural foundation of all the higher types of plants, and the firmness and resistance of the whole or its parts depend upon them or their derivatives.

We may take as an example a lettuce as cut for a salad, firm and crisp; analysis shows that only about 5 per cent. of its weight consists of organic material, the rest is water. Our first question may be how a firm resistant structure is produced from such materials. The whole is composed of cells or their derivatives, and the turgor of the living cell gives the key. The adult

cell consists of a living body of slimy protoplasm with a nucleus. The protoplasm encloses a large cavity, filled with cell-sap, which is water with substances such as sugar dissolved in it, and they are controlled and held there by the continuous film of protoplasm which lines the cell-wall. This last is an unbroken pollicle or skin deposited as an outer covering. During life the cell thus formed is turgescent, and mechanically firm like a football or a pneumatic tyre. The turgor arises from the fact that the sugar and other substances in solution in the cell-sap are osmotically active, absorbing water, and the increase in volume distends and stretches the cell-wall until the osmotic pressure within is balanced by the elastic resistance of the wall. The pressure involved in a normally turgescent cell amounts to five or more atmospheres; in extreme cases it may be as high as 20 atmospheres. It is this which is the foundation of the crispness of a fresh lettuce. If it withers it becomes limp like a deflated tyre, or a pricked football, the turgor, upon which rigidity depends, having been relieved by evaporation.

Simple turgor of the individual cells, combined with certain mutual tensions of tissue-masses, suffices to give mechanical stability to small herbaceous plants, but even in these firmer strands appear as the parts mature, which together form a strengthening skeleton. They are like the girder-system in a ferro-concrete structure, while the skeleton is embedded in the softer tissues. But a plant so constructed is more effective than a ferro-concrete building in this respect, that as it gives way to the impact of wind, the softer tissue yields and does not crack as concrete would do, but recovers with perfect elasticity. The nearest comparison may be with the material of the cover of certain motor tyres, where fibre is embedded in rubber.

The ferro-concrete construction may merge gradually into the columnar plan of a woody tree-trunk, such as an oak or elm, the woody column of which results from continued activity of the cambium tissue in depositing each year a successive layer of wood upon those of preceding years. The result is practically a solid cylinder. This may be for engineers a back number as a type of construction, but in that it possesses automatic growth according to demand, and provides for increasing mechanical resistance, storage of materials, and their transit—in particular the passage of water—we see in the columnar tree-trunk a structure the like of which the engineer has never devised.

More exact, and mechanically perfect schemes of construction are seen in the *Monocotyledons,* such as Grasses and Palms, in which there is, as a rule, no cambial growth. As they sometimes attain very large size, the best possible effect must be obtained from a limited amount of material; moreover, the less that is used the lighter will be the structure, and the greater the physiological economy. It is in these plants that we see organic nature in her most artistic mood, and her methods are such as

have (later in the day) been used by architects and engineers. The whole stem of monocotyledons is directly derived from the apical cone; the tissue as it matures expands so as to form the whole column of the stem, which is sometimes a solid cylinder, as in Maize or Sugar Cane or a Palm; but the greatest mechanical resistance is supplied by the outer rind, while the inner region is less resistant. It is only a step from this to the hollow column, the centre being cavernous, like any cylinder of a steel construction. The risk in excessive strain is then that of buckling, especially when a stem weighted with a large expanse of leaves and fruits is exposed to winds. In the grasses, and particularly in the giant bamboos, which may be more than 100 feet in height, this risk is provided against by strong transverse septa, one at the insertion of each leaf, and their distance apart diminishes towards the base, which has the effect of giving added strength where the leverage is the greatest. Such examples will suffice to suggest the methods of mechanical construction most common in stems; even their cylindrical form is of importance since it opposes equal resistance to winds coming from any quarter. Leaves may also be examined from the mechanical point of view. The leaf-stalk, which allows the flat blade some degree of freedom to yield to the impact of wind, is yet so formed, with its channelled upper surface, as to afford due support. But the blade commands more interest, being the essential organ of nutrition under sunlight. Its flattened form, that serves its purpose so well, is very valuable: the larger its expanse the more efficient it is, but the greater the mechanical risk. Its structure is, however, such as to strike a reasonable balance of safety. In *Dicotyledons* its expanse is spread out upon a network of veins, with strong midrib and lateral ribs that act like the frame of an umbrella. Each rib is traversed by a vascular strand, and often with strengthening tissue above and below it, so as to form a girder-like structure with a high degree of mechanical resistance. The soft, spongy mesophyll that fills the meshes of the network is mechanically weak, but the whole is braced together by the firm layers of the upper and lower epidermis. The result is a coherent blade. The greatest danger will be that of tearing under strong wind, from the margin inwards, and particularly where there is any indentation. But this is often met by the arching of the veins just within the margin, with structure like the selvage of woven cloth, or by a continuous marginal strand that acts like a hem, or again by indurated triangular patches at the base of the marginal indentations, which in position and in function compare with the gussets used in clothing.

In *Monocotyledons*, where the veins are usually parallel, and having a simple form of the blade, the mechanical problem is solved by a somewhat different structure. A transverse section will traverse the veins at right angles, and the structure presented is not unlike that of a girder-bridge similarly cut. Each vein has

as a rule a firm strand of resistant fibres above and below it, so disposed as to form an obvious double T girder. Since these girders are held in their relative positions by the softer tissues, the result is a structure of very high rigidity, though readily liable to yield before wind pressure.

Observations such as these lead to a brief study of the resistant fibrous tissue itself. It is composed of long fibrous cells so closely interlaced that each strand so composed is comparable mechanically to a metal wire. Submitted to accurate tests it is found that many plant-fibres compare favourably with metal wires as regards actual breaking strain. But they meet the demands of resistance in a different way. Metals are more or less ductile, fibres are not. In fibres the limits of perfect elasticity and of breaking strain are almost the same, as measured by kilogrammes to the square millimetre of section. In metals they are widely apart. Put into simple words, we see that Nature has provided herself with a tissue which yields to a strain but recovers very perfectly when the strain is removed. The result is that a palm or other tree after a gale resumes its original form directly after the wind falls.

There is, however, another quality in plant fibres as distinct from metals, which is important for the use of wood in making musical instruments, such as violins. If metals be submitted to often repeated strains their internal viscosity increases, and they stiffen. In plant fibres, however, the reverse is the result. The tissue becomes more pliant. This explains the change that every violinist knows, that with use the instrument " warms up," and becomes more responsive. However important this may be to the violinist, it is not clear how it would be of importance in the plant.

The mechanical requirements of roots stand in strong contrast to those of stems and leaves. In upholding any upright plant against stress of winds, the roots are exposed to a tensile strain like a string or cord. These have their constituent strands closely twined, so that the strain shall fall on all collectively. In the same way it is commonly seen in roots that the mechanically resistant strands are grouped closely near to the centre of the transverse section, a condition that appears also in the stems of large pendent fruits.

Such facts as these, relating to the disposition and qualities of the mechanically resistant tissues in plants, show that the contraction is far from being haphazard, but that the use of materials is comparable to that of scientific engineering or architecture. They raise at once the question of causality. It might be suggested that blind chance, combined with the selective screen of " trial and error " may have led to the conditions which we see. This will hardly be held as a satisfactory explanation, in the absence of any directive influence, of structural results which

resemble so closely the works of man scientifically devised. It is in accord with experiment to see, as a possible directive influence leading towards the structure observed, the positive effect of continued strain. Detailed experiment has shown that mechanically resistant tissue appears in enhanced amount where the strain which it is fitted to resist has been existent during development. A familiar instance is the induration of tendrils which have reached a support, as compared with those which have not. There is indeed some evidence not merely of increase but even of initiation. Whether such suggestions would suffice to explain the origin of the girder construction may best be left an open question. Meanwhile, however, it remains most remarkable how nearly the plant has adopted the methods used by engineers and architects; but priority in time certainly is with the plant, for girder construction is illustrated by fossils from the coal, ages before man appeared upon the earth.

Selected Papers.

"Early Stages in the Earth's History."

By Henry Bury, F.G.S.

Although for the convenience of our Society we divide Science into a number of sections, yet in reality no one branch of science can stand alone, but all are intimately connected one with another. Thus Geology depends on Chemistry and Physics for a knowledge of its minerals and crystals; on Biology for its fossils; on Geography for facts concerning the form and distribution of land and sea; and on Astronomy, as will be shown in this lecture, for the earliest stages of the earth's history. For Geology strictly speaking does not begin until the earth had acquired not only a solid crust (if indeed it ever passed through a liquid stage) but an ocean as well, and after we have studied all the lessons which have so far been extracted from the rocks, there will still remain some interesting problems in which only Astronomers and Physicists can help us.

The old classification of the strata into Primary, Secondary and Tertiary worked well enough so long as the oldest known sedimentary rocks were the Cambrian, at the base of the Primary, or Palæozoic series: but we now know that below the Cambrian, where Murchison found only gneiss, which he took to be the primary crust of a once-molten globe, there lie vast thicknesses of strata which, though usually unfossiliferous, and often much altered by heat and pressure (metamorphic rocks) are unquestionably of sedimentary origin. The rocks of the Primary series from the Cambrian upwards, are many times as thick as the Secondary, Tertiary and Quaternary put together, and probably took many times as long to form; but all authorities are agreed that the Pre-Cambrian Era was at least as long as the whole of the Post-Cambrian, and very probably much longer. It became advisable, therefore, to invent a new category for the Pre-Cambrian, and the term "Archæan," proposed by Dana, has been generally adopted in this country; though unfortunately the word is restricted by many writers to only the lower portion of the series in question. Owing to the almost entire absence of fossils the detailed study of these rocks is a matter of extreme difficulty, and even now there exists no unanimity as to the classification or relative importance of the various formations; but certain general features emerge which we must examine, with a view to ascertaining what light they throw on the early history of our globe. Passing over the widespread metamorphism, already alluded to, because it is by no means confined to the Archæan, and cannot be taken by itself as a criterion of age, we find a number of points in which these early periods closely resemble those of later date. First of

all we may mention the unconformities, which were at one time regarded as due to cataclysms, but are now known to represent periods of dry land (often of immense duration), when the sea retreated, and few, if any, sediments were formed on the present continental areas. Of these the most important lie between the Secondary and Tertiary strata, between the Primary and Secondary, and between the Archæan and Cambrian, while there were at least three more in the Archæan period itself; but there are many others of less importance throughout the whole series.

But besides these alternations of marine and continental periods, there were rhythmic movements of the earth's crust, leading, at immensely long intervals, to special volcanic activity, and to the formation of great mountain chains. The best-known of these " revolutions " were in the Miocene and the Permo-Carboniferous respectively, but it seems that there were at least two in Pre-Cambrian times. Opinions differ as to which was the greatest, but we may safely say that there is no sign of any progressive loss of activity, the Miocene revolution being, according to one of the leading authorities, " one of the most widespread and intense on record "; moreover, the earliest known period of disturbance was preceded by a period of apparent tranquillity, during which sediments were laid down to a thickness of at least nine miles (48,000ft.). Nor is it only in these larger features that we recognise the essential similarity of the forces at work in Pre- and Post-Cambrian times; the composition of the sediments themselves points in the same direction. The beds of shingle forming on our shores at the present day are represented in various geological periods by conglomerates and puddingstones; our sands, by sandstones and quartzites; our muds, by clay, shale, slate, and schist; and our coral reefs and calcareous muds (including Globigerina ooze) by limestones and marbles; and although in the Archæan the metamorphic forms (quartzites, schists, and marbles) predominate, yet all kinds are represented, and apparently in very much their modern proportions.

The only important points of difference, in fact, between the Pre-Cambrian and the later rocks are the greater metamorphism and rarity of fossils in the former: but both are differences of degree rather than of kind, for metamorphism is common in Palæozoic formations, while fossils are by no means unknown in the Archæan. The famous Eozoon canadense, once referred to the Foraminifera, is now generally discredited, but several fossils are reported from the Upper Archæan, and within the last few years some microscopic algæ (Phycochromaceæ) have been found in the Lower Archæan, while the oldest known rocks (Grenville) contain immense quantities of graphite, which it is not unreasonable to ascribe to plant life.

Although therefore the biological evidence, so far as we can interpret it, shows more primitive conditions in the Archæan, yet the geological evidence reveals nothing that can be called the primary crust of the earth, and nothing that points to a nearer

approach to a molten interior : on the contrary, the fact that some of the early formations, which must have sunk even in Archæan times to a depth of several miles, are practically unaltered by heat, indicates that the temperature-gradient of the crust in those days was little if at all greater than at the present day; while the occurrence of unmistakable signs of glaciation in latitudes now temperate makes it probable that the earth's surface did not receive any more heat, either from below or from above, than it does now.

The great English pioneer in geology, James Hutton, declared that he found in the rocks " no vestige of a beginning, no prospect of an end "; and although he was violently attacked, fifty years later, by Lord Kelvin (who interpreted him to mean that there never had been a beginning), yet in spite of the great increase in our knowledge since Hutton's time, we still find that he was right, while Kelvin's attempt to limit the age of the earth to less than 50 million years has proved to be hopelessly wrong.

We have then reached a point beyond which the geological record will not take us; and it seems that it is no more possible to learn the earliest stages of the earth's history from the rocks than it is to obtain the earliest history of man from written documents. In each case, in order to advance further we must seek out other sources of information : and just as the historian calls in the help of the archæologist, so the geologist turns to the astronomer and asks what light he can throw upon the subject.

The Nebular Hypothesis of Laplace, which is the first attempt to explain the world's origin that we need consider, has been praised by some writers as one of the highest achievements of the human intellect, worthy even of a place beside Newton's discovery of gravitation; yet while Newton tested his theory in every possible way, Laplace put his forward in a very crude form, contenting himself with a mere enumeration of the facts which it was designed to explain, without attempting to deduce new facts, or to submit to mathematical analysis the numerous problems which it suggested. Yet in spite of this defect—of which Laplace was fully aware, though he did nothing to remedy it—his views met with almost unquestioned acceptance for over a hundred years; and although some mutterings of discontent were heard towards the end of the nineteenth century,yet it was not until the beginning of the twentieth century that the first determined attack was made, which, after some years of controversy, has ended in the complete overthrow of Laplace's hypothesis. This attack, and the alternative theory which, with some modifications, is now widely accepted, came, not from an astronomer, but from the American geologist, T. C. Chamberlin; and still more curiously, it was in some degree foreshadowed by a suggestion made by another non-astronomical worker—the great French biologist Buffon.

But before proceeding to consider the latest views on this subject, let us first briefly examine Laplace's hypothesis, and see

wherein it fails. He began by postulating an immense gaseous "atmosphere," surrounding the sun in the form of a disc, and extending beyond the limits of the most distant planets. This system, which he compares to Saturn and its rings, was revolving about its axis, and as in course of time it contracted, the rate of revolution would increase, in accordance with a well-known law of dynamics. There would therefore sooner or later come a time when the centrifugal tendency thus caused—the fluid pressure of the gas acting outwards—would overcome the gravitational attraction towards the interior, and rupture would occur near the outer margin of the disc. Laplace imagined that this rupture would give rise to a ring, the particles of which would be drawn together by gravity, and condense into a planet: after which, as contraction of the central mass proceeded, successive rings would be formed, and successive planets would arise in the same manner as the first. But when this hypothesis is submitted to mathematical tests, insuperable difficulties arise. It is admitted that, granting the original nebula, a gradual increase of the rate of rotation would eventually lead to rupture; but there is no reason why this rupture should give rise to separate rings, rather than to a continuous escape of gas from the periphery: while it seems certain that, even if such rings were formed, they could not possibly condense into the required planets, but each ring would break up and give rise to a number of separate bodies (spheroids) of nearly equal size, and revolving in nearly the same orbits. Another serious objection to the hypothesis is that it requires that all the planets and their satellites should revolve in the same direction, whereas it has transpired since Laplace's time that no less than eight satellites have retrograde rotations. We cannot blame the French astronomer for not foreseeing this, but he might have noted the very slow rotation of the sun itself, which constitutes a serious difficulty; because the rate of rotation has, *ex hypothesi*, been increasing ever since the beginning. It is possible to calculate the mass and rate of rotation of the original nebula—the angular momentum required by this theory to split off the outermost planet; and the amount so arrived at ought to bear a close relation to the sum of the angular momenta of the sun and all the planets at the present day: but on making the necessary calculations we find that the former is about 600 times too large.

Yet another way in which we might suppose the planets to have been formed is by condensation within a nebula, a process of which we seem to see instances in the spiral nebulæ; but here again the deficiency of angular momentum of the solar system makes itself felt, and we find that, although a spiral nebula may give rise to stars of about the same mass as the sun, nothing at all approaching our solar system can have been produced in this way. It follows that the observed phenomena could not in any way have been evolved out of such a nebula as was postulated by

Laplace, and that therefore some new method of accounting for them must be discovered.

Buffon long ago suggested that the planets might have arisen from fragments knocked off from the sun by collision with a comet; and although direct collision (whether with a comet or a denser body) is not helpful, yet Chamberlin recognised the value of assuming the influence of an outside body in detaching portions of the sun; and although his Planetesimal Hypothesis (which has undergone many changes) is not generally accepted in this country, yet it is really the parent of the views recently put forward by Jeans and Jeffries. It is supposed by these writers that a star much larger than the sun approached the latter near enough to raise a huge tidal wave in its gaseous atmosphere, and that this wave grew until the attraction of the star overcame that of the sun, and a stream of gas was ejected. But the star was moving rapidly all the time, and so the gas, given off continuously from the crest of the wave, spread out in the form of a filament, until the star was too far off to cause any further rupture in the wave. Part of that filament may have fallen back into the sun, while other parts escaped altogether from its influence; but a considerable portion of it would revolve round the sun, and would almost at once break up and condense into a series of planets.

Up to this point the differences between the English and American theories are not very serious from our point of view, but here a more important divergence occurs. Chamberlin thinks that the cooling of the gas would be very rapid, and although its heavier portions might coalesce to form liquid nuclei of the planets, yet most of it would condense into minute solid particles (planetesimals) which would rain down on the nuclei and so build up the planets. In his view, therefore, the earth had a solid surface practically from the first, but Jeffries denies the possibility of this, and thinks that every planet must have passed through a liquid stage. At first sight it seems that the former hypothesis is more in accordance with the geological evidence which shows no evidence of a molten surface; but it must be remembered that geology requires not merely a solid surface, but an ocean as well; and the stage at which this would be formed would depend more upon the heat of the sun than upon the condition of the earth's crust. The sun, at the time the planets were formed, was in the " giant " stage, while it would have to reach the " yellow dwarf " stage before water could condense on the earth's surface; and although the time required for this change is unknown, it is long enough to allow the earth, on any hypothesis, to develop a crust of such thickness that the amount of internal heat reaching the surface would be little if at all greater than at the present day.

If, however, we accept provisionally the hypothesis of a liquid stage in the earth's history, we come next to another astronomical process which has been held in some quarters to have geological importance, namely, the evolution of the moon. Sir

G. Darwin maintained that the friction of the tides must have gradually slowed down the period of rotation of the earth on its axis, and as this would cause the distance between the earth and moon to increase, he concluded that the two bodies had once been united, at a time when the rate of rotation was very rapid.

He found that when that rate was about four hours, the whole system would become unstable, and the tidal protuberance on the liquid earth, caused by the sun's attraction, would split off to form the moon, which has been retreating ever since.

Various attempts have been made to utilize this theory (which, it should be said, is by no means universally accepted) in the service of geology. At the period when it was first advanced, geologists were agitated over the small amount of time allotted to them by Lord Kelvin's theories; and the well-known astronomer, Sir R. Ball, thinking to help them, suggested that the rate of erosion and deposition might have been greatly increased by tidal waves of enormous size—600ft. or more—in Pre-Cambrian and palæozoic times. But this proffered assistance was by no means well received by geologists, who pointed out that such turbulent conditions would produce an excess of ill-sorted conglomerates, and other coarse materials, whereas the observed sedimentary rocks, even in Archæan times, are, as already mentioned, of normal character.

All need for such speeding-up of geological processes disappeared when radio-activity was discovered, and it was therefore doubly surprising to see Sir R. Ball's suggestion revived at the British Association in 1927—not by an astronomer this time, but by a biologist, Dr. George Bidder. He maintains that at the close of the Archæan there was " a period of gigantic tides, on such a cataclysmic scale as gravely to interrupt the sequence of evolution "; and that " a world of mud, clattering stones and torrential currents " continued to the end of the Devonian. This reads rather like a page from a book of a hundred years ago, when cataclysms were in fashion, but is unlikely to receive geological support at the present day. Dr. Bidder, however, does not rest his case on geological or astronomical evidence, but on the biological fact that certain fishes (Cephalaspis, and Pterichthys) and Trilobites (Paradoxides, Olonellus, etc.) have not only well-developed stream lines, but also spiny projections which he regards as anchors to prevent their being swept away by the tidal currents. But, as already pointed out, such " torrential currents " would produce sediments very different in character from those actually found, and it is significant that the Trilobites cited are found in fine-grained slates, which were originally mud, and can only have been deposited in fairly tranquil waters. The case of the fishes is even worse, for they occur in the Old Red Sandstone, which is universally admitted to have been formed in inland seas, where large tides would be physically impossible. A further fact which is scarcely alluded to is that the animals with spines are only a small percentage of those that existed, the

majority showing no provision at all against the hypothetical dangers.

Nor is astronomical evidence any more favourable. Sir G. Darwin from the first doubted whether tides of more than double the present height had existed within the geological period; and quite recently Jeffries has expressed the opinion that the ocean was not formed until the rate of rotation had reached 20 hours at least, which would give tides only about half as large again as those of the present day.

A second manner in which the tidal evolution of the moon may have been geologically important is in causing changes in the earth's shape. At the present time the period of rotation and the flattening of the poles are in close harmony with one another, but at higher rates of rotation the flattening must have been greater, and adjustments must since have occurred. The solid crust however would resist such adjustments, which therefore would probably be intermittent, and might, if forcible enough, give rise to mountain building. The ocean on the other hand would adjust itself immediately, causing a flow from the equator to the poles while the stresses in the crust were accumulating, and in the opposite direction when they were released; and it is not improbable that some of the relative changes of level of land and sea may be accounted for in this way.

Yet another possible influence of the birth of the moon on geography and geology is seen in the suggestion, at one time popular, that the Pacific Ocean is a kind of scar marking the spot from which the moon was torn away; but Jeffries assures us that when the rupture took place the earth was either wholly liquid, or at most had only a very thin crust, and that no scar can have remained for more than a few days at most. Nevertheless it is tempting to believe that the breaking up of a thin primitive crust may have done something towards initiating the present distribution of the continents, which otherwise presents a difficult problem.

The outer crust of the earth is now generally admitted to consist of two layers of different density, the " Sima " (mainly basalt) which forms the floors of the oceans and is continuous, at a considerable depth, under the continents; and the " Sial " (mainly granite) which forms the continents and their borders (continental shelves). The Sial, which is lighter than the Sima, and may be said to float upon it, is not continued (or at best only as a very thin layer) under the oceans, which occupy about one-third of the earth's surface. But if, as it is reasonable to suppose, this separation into layers is a primitive feature, due to differences of density, we should have expected to find the Sial spread evenly over the whole surface; in which case it would have been buried under a mile of sea, and there could have been no continents at all. As however the earliest known rocks are sedimentary, it is clear that the Sial was even then concentrated in certain areas, and the simplest explanation of this seems to be

that the moon carried off most of the original Sial layer, the remainder of which was then scattered over the surface and came to rest approximately in the positions of the present continents. Lowthian Green, in his " Tetrahedral Theory," showed that there is a certain rough symmetry in this continental distribution, but his attempt to account for it by mere elevation and depression of a homogeneous crust does not fit in with the modern view that the continents and ocean floors actually differ in composition. Seeing that there have been many periods of mountain building, and that in every great mountain chain the Sial is compressed and folded into about a quarter of its former area, it is possible that this layer may, in Pre-Cambrian times, have been thinner and spread over a wider area than now, but many geologists are of opinion that the positions of the main continental areas have remained fairly constant; nor need the areas of dry land have been larger than now—on the contrary, they were probably smaller, much of the increased Sial area probably lying as a continental shelf under a shallow sea.

Wegener, who rejects the tidal origin of the moon altogether, postulates a single Archæan continent, surrounded by a huge ocean, and gives pictures of how the existing distribution of land may have arisen from the separation and floating apart of portions of this continent : but he makes no suggestion as to how the single mass first originated, or why it remained unaltered throughout Archæan times; and Jeffries gives reasons for thinking that no such single continent could ever have existed.

There remains the question of chronology. The only geological clock on which any reliance can be placed depends on the rate of decay of uranium; for the ultimate product of that decay is lead, and therefore if we can ascertain, in a specimen of rock, the proportion of lead to uranium, we have a fairly accurate measure of the time which has elapsed since that rock was formed. The oldest igneous rocks examined give an age of about thirteen hundred million years, but it is fairly certain that some of the sedimentary rocks are older still. By another, but less precise method, the maximum age for the earth's crust is placed at eight thousand million; but we must remember that the crust may have been in existence for a long time before water was able to condense on the earth and start the geological processes. On the astronomical side Jeffries' estimates of the age of the solar system, based on the eccentricity of the orbit of Mercury, give dates between 1,000 and 10,000 million years; while yet other calculations place the age of the moon at 4,000 million, and the formation of the ocean at not more than 1,600 millions. These different calculations, then, are all in very fair agreement, but of course they are only approximate, while further investigation may reveal rocks far older than any yet examined.

These speculations on the dim and distant past, though they have no practical use, may have a certain philosophical value in

helping us to see ourselves and the universe in better proportion. Man is fond of calling himself the " lord of creation " and imagining himself the most important thing in the universe; but what support does science give to this arrogant assumption? Life has existed on the earth for probably some 1,500 million years, and, according to Sir J. Jeans, may well continue for another million million; so that Mother Earth, instead of being an old woman, is really only at the outset of her career; no wonder, then, that geologists find in her no trace of senile decay! Man on the other hand has probably not been in existence much more than one million years, which is a very small fraction of the earth's history, and whether in the future men will die out, as so many animals have done, or whether they will " rise on stepping-stones of their dead selves to higher things," is a question no one can answer. But when we consider the vastness of astronomical space, the immensity of geological time, and the almost infinite number of steps in the evolutionary process—from any one of these standpoints man is an insignificant object, hardly more than a speck of dust in what Carlyle calls " the great vital system of immensity."

" Recent Additions to the Historical Records of West Parley and Neighbourhood."

By Lieut.-Colonel C. D. Drew, D.S.O., F.S.A.

In October, 1928, a house was being built on Dudsbury Hill, about 220 yards E.S.E. of the eastern entrance of the Camp. Mr. Dayrell-Reed, of West Parley, happened to notice in the earth thrown up from the foundations a number of sherds of pottery. The owner kindly allowed further search and, in all, about 100 fragments were found. They were submitted to the British Museum and pronounced to be Romano-British. On comparing them with the pottery found by Mr. Heywood Sumner at the New Forest kilns, many of the fragments were found to be of similar make. Unfortunately the site was covered by the house and no excavation was possible; the workmen stated that there was no indication of anything unusual before the surface was disturbed and that no old foundations were found. The sherds were all within 18 inches of the surface and no other objects, except a few roughly worked flints, were found. The occupants of the site, who threw the broken pottery on to their rubbish heap, were evidently humble folk, and there is no evidence to show that there was a villa or homestead of a landed proprietor in the neighbourhood.

However, the find gives the first evidence of Roman times in the parish, and of this I was particularly glad, as shortly before I had a setback regarding a bronze coin dug up in a garden at

Dudsbury, which, in my ignorance, I had imagined to be Roman. It displayed a Roman-looking head on the obverse and Justice with her sword and scales on the reverse; there was no inscription. I took it to the British Museum and was told that it was a " quadrilla " or quarter-reale of the Republic of Columbia, struck at Birmingham in 1830.

Dr. Williams Freeman in " Field Archæology," and Mr. O. G. S. Crawford in " Man and his past," both mention a Roman Road from Winchester to Poole or Hamworthy. It had been traced as far as Stony Cross in the New Forest, but beyond that its course was unknown. A few lines drawn on the map showed me that it must pass through the parish, and the probable crossing places over the River Stour were only three. After some days search, I was fortunate enough to find a stretch of unmistakable Roman Road in the field just south of the first milestone east of Wimborne on the Ringwood Road. The road is some 18ft. wide, well cambered, with a silted-up ditch on each side, and is in excellent condition for 300 yards. Westwards it disappears for a time, but west of Park Farm it re-appears in a degraded condition, but with the important feature of a field boundary running along it for 300 yards. Its line prolonged passes near the bridge and old ford over the Stour at Wimborne, and strikes the known Badbury Rings-Hamworthy Roman road on the hill above Corfe Mullen village. Eastwards there is no trace; cultivation and cottage gardens have obliterated it and perhaps the modern road is on top of it.

My search for this road on Parley Common, though unsuccessful in its main object, brought to light the forgotten highway from Ringwood to Poole, with a branch to Wimborne, which crossed the Moors River at Palmer's Ford and fell into disuse when the existing turnpike road was made in 1759. Where not obliterated by later fir plantations and cultivation it can be recognised for some six miles winding over the heath. It was not metalled, and when one track became too bad for use the traffic made another alongside, so that, in places, one finds 25 parallel tracks.

The first Lord of the Manor of West Parley mentioned by Hutchins is Gilbert de Essefield, who held it in 1314, but we have lately been able to go back nearly a century earlier when William de Wytefield transferred the Manor to John de Esefield (the ancestor of Gilbert) in 1227. I take no credit for this discovery; it was merely copying what had been already published by Messrs. E. A. Fry and G. S. Fry in " Dorset Records," but the form of the record is interesting. In the Public Record Office are certain documents dating from Richard I to William IV called " Feet of Fines." This curious name does not signify a money payment or penalty but that the document is a record of the " Final Concord " between two disputing parties in a case in the Court of Common Pleas.

It was found that a settlement recorded in this Court gave a good title to ownership of land, so it became the custom to bring a fictitious case to law, merely to obtain this record. The decision of the Court was written in triplicate on one sheet of parchment, which was then cut into three portions with a wavy or indented line of division, so that in case of dispute or suspected fraud the three pieces could be fitted together. This indented edge gave rise to the term " Indenture " for a written legal agreement. Each party received one copy of the decision of the Court, while the third copy, or the " Foot of the Fine," was preserved in the Court Records.

These Feet of Fines are, of course, of the greatest value to the village historian and are a mine of genealogical and topographical information, and one frequently comes across odd and amusing details, as, for instance, when one party agrees to give the other, on such and such a day, for ever, a red rose or a pair of gilt spurs, value 6d.

I am also indebted to Mr. E. A. Fry for the Protestation Return of West Parley. In 1641 the Government was greatly alarmed at the danger of Popish plots. In order to find out who were professed Roman Catholics, a Form of Protestation was sent to every parish in the Kingdom, by order of Parliament.

Every male inhabitant over the age of 16 had either to assent to the Protestation or be noted as a " recusant," the Form being considered, in the language of the day, " a Shibboleth to discover a true Israelite."

The form was as follows :—" I. A.B. doe in the presence of Almightie God, promise vow and protest to maintain and defend, so far as lawfullie I may, with my life power and estate the true reformed Protestant Religion expressed in the Doctrine of the Church of England against all Popery and Popish Innovations within this Realme contrarie to the same Doctrine and according to the dutie of my Allegiance [to] His Ma'ties Royall person, power and estate, as also the Power and Privileges of Parliament, the lawfull rights and Liberties of the subject and every person that maketh this protestation in whatsoever he shall do in the lawfull pursuance of the same. And to my power and so far as I lawfullie may I will oppose and by all good waies and means indeavour to bring to condign punishment all such as shall either by Force, Practice, Councells, Plotts, Conspiricies or otherwise do anything in this present Protestation contained. And further, that I shall in all just and honourable waies endeavour to preserve ye Union and Peace between the three Kingdoms of England, Scotland and Ireland, and neither for hope fear nor other respect relinquish this promise, vow and Protestation."

Forty men of West Parley assented to the Form, in the presence of the Rector, Churchwardens and Overseers, while three are reported as " Recusants." The Returns are preserved in the House of Lords.

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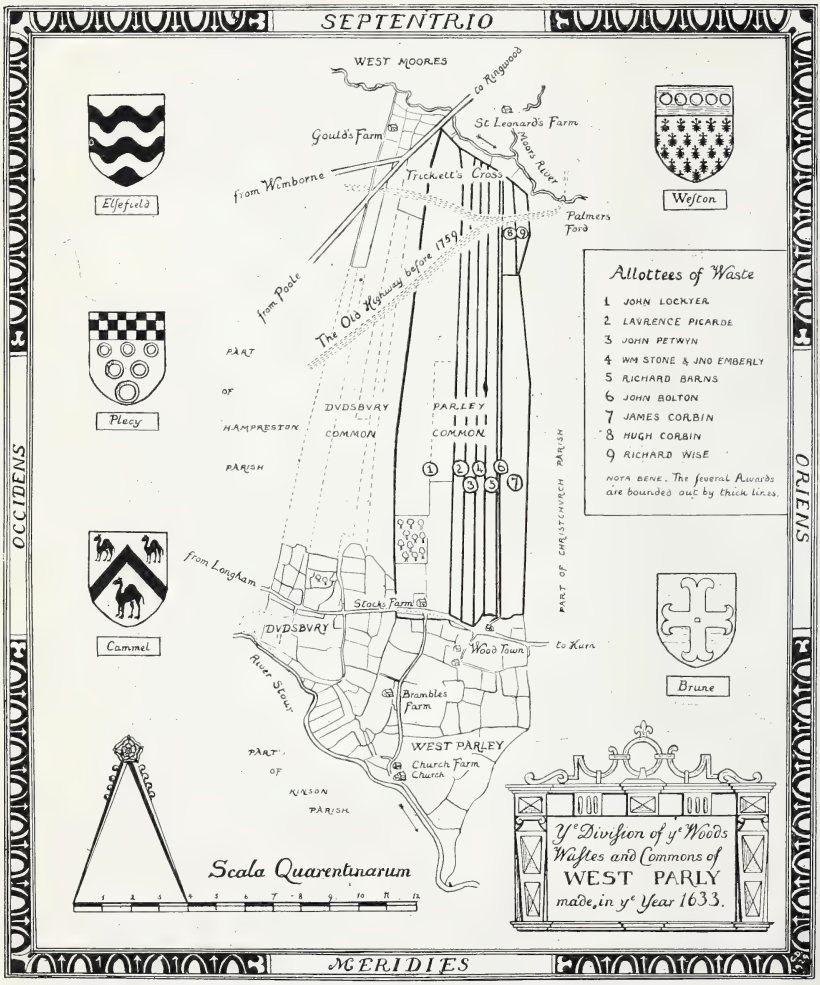
NATURAL
HISTORY


SEPTENTRIO
OCCIDENS
ORIENS
MERIDIES
WEST MOORES
to Ringwood
St Leonard's Farm
Moors River
Gould's Farm
from Wimborne
Trickett's Cross
Palmers Ford
from Poole
The Old Highway before 1759
PART OF HAMPRESTON PARISH
DVDSBVRY COMMON
PARLEY COMMON
PART OF CHRISTCHURCH PARISH
from Longham
Stocks Farm
DVDSBVRY
Wood Town
to Kurn
River Stour
Brambles Farm
WEST PARLEY
Church Farm
Church
PART OF KINSON PARISH
Elsefield
Plecy
Cammel
Weston
Brune
Allottees of Waste
1 JOHN LOCKYER
2 LAVRENCE PICARDE
3 JOHN PETWYN
4 WM STONE & JNO EMBERLY
5 RICHARD BARNS
6 JOHN BOLTON
7 JAMES CORBIN
8 HUGH CORBIN
9 RICHARD WISE
NOTA BENE. The severall Awards are bounded out by thick lines.
Scala Quarentenarum
1 2 3 4 5 6 7 8 9 10 11 12
Ye Division of ye Woods Waistes and Commons of WEST PARLY made, in ye Year 1633.

Finally I have to report the finding of an important document in rather an unusual way. For two years I had been seeking the Inclosure Act and Award relating to Parley Common, but the search was without result, and no Act appeared to be in existence. In September, 1928, I received permission to look through the family papers of a lady who lives in Somerset, and whose ancestors had resided in West Parley for some 200 years. My chief object was to trace the Lordship of the Manor in the 17th and early 18th centuries. She showed me a large number of documents—leases and releases, agreements, farm maps and memoranda, marriage settlements, etc., and almost the first one I saw was labelled " A Coppey of ye Division of ye Woods Wasts and Commons of West Parly and West Moores made in ye Year 1633." This document was a contemporary copy of an Award made by a Commission appointed by the Court of Chancery, and search in the Public Record Office has disclosed the whole story. In 1575, Sir Richard Weston, the Lord of the Manor, sold the whole of the Manor to the sitting tenants, each of whom received the freehold of his enclosed lands. The Heath, however, remained common until, in 1619, a quarrel among the villagers developed into a suit in Chancery. The Court appointed a Commission of local gentlemen to enquire into the matter, and, after 14 years, the dispute was ended by the division of the Common among the Commoners, each man receiving a freehold allotment, in proportion to the area of his farm, in place of common rights over the whole Heath. This, then, was the origin of the curiously shaped parallel strips which exist to this day, and, though some of them have been sub-divided at later times, are still a striking feature on the 6 inch Ordnance map of Parley Common.

The accompanying map shows these divisions as made to the original allottees. They have been superimposed on the Tithe Map of 1839, as this is the first accurate map of the parish, and while showing many features which have been obliterated by later changes, it is sufficiently modern for the position of the Awards to be recognised. The Southern boundary of the allotments is a little doubtful, as the exact line is difficult to determine in the rather vague wording of " Ye Coppey." The acreage agrees closely with that given in the document and there is no doubt as to their position and extent otherwise. Field Names given in the Tithe Map confirm Petwin's and Emberly's awards, while Parson's or Glebe Common remains unchanged from the day it was handed over to Laurence Picarde, the Rector. The strange shape of the awards has a reason; the Heath was chiefly used for cutting turf for fuel, but owing to the fact that it is crossed diagonally by a wide swampy valley, its value as turf land varies; by dividing it into long parallel strips each man had good and bad turf land alike.

The shields on the map display the arms of the principal families who have held the Manor since the 13th century.

"Glass and Glass Making."

By Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.

The lecture on glass and glass making which I gave last session was concerned with ornamental glass, and its varieties in the various countries of the world. I now propose to say something about the more practical forms of glass, the various forms of window glass, optical glass, and other various uses of glass. Before going further it will be well to consider what glass is, and some of its properties.

Molten glass may be regarded as a liquid, being a material solution of a number of chemical substances, usually silicates and borates, not dissolved by the action of water, but by great heat in a furnace. In the case of glass, its passage from the liquid to the solid state is gradual and perfectly continuous, without evolution of heat or retardation of cooling, as occurs in other liquids. Glass may be then described as a congested liquid, becoming gradually stiffened till its viscosity becomes so great that it acts like a solid. Under certain circumstances and at a suitable temperature, glass may undergo "devitrification," i.e., crystallisation may take place. This is due to the different freezing points of the dissolved substances of which glass is composed. This sometimes gives difficulties in manufacture, and requires great care in the regulation of the temperature in the various processes. With the exception of certain special glasses used for scientific purposes, such as optical glass, thermometers, and vessels intended for unusual treatment, all industrial glasses consist of mixed silicates of a few bases, viz. the alkalis sodium and potassium, the alkaline earths, calcium, magnesium, barium, the oxides of iron and aluminium, zinc oxide and lead oxide. These are not united in chemical combination, but are solutions in varying proportions of definite compounds in one another. The range of possible compositions of glass is limited by the cost of the various materials, and by the available temperature of the furnaces. The presence of excessive proportions of certain substances tends to raise the temperature for the free fusion of glass, and when this exceeds 1600° C. the manufacture of glass in ordinary furnaces becomes impossible owing to the expense. As regards the chemical behaviour of glass during manufacture, it must be borne in mind that though glasses are of the nature of solutions, yet these solutions tend towards a state of saturation, thus a glass rich in silica and deficient in bases will readily dissolve any bases with which it may come in contact, while, on the other hand, a glass rich in bases and poor in acid will readily absorb acid bodies from its surroundings. During the process of melting, glass is usually contained in fireclay vessels. These are specially chosen to offer the molten glass as few as possible of those materials in which the glass itself is deficient. In

spite of this, certain glasses rich in bases, such as the dense lead and barium glasses made for optical purposes, rapidly attack the fireclay. Finished glass also is affected by atmospheric agents, e.g., glass containing an excess of alkali is very hygroscopic, and undergoes rapid decomposition in a damp atmosphere.

Pure water attacks all glass to a greater or less extent, the more so the higher the temperature and the pressure, and the best glass can only resist its action for a limited time. Water containing alkali acts rapidly on glass, acid water acts less vigorously—a good test for the stability of the surface of glass is to expose a strip to the vapour of H Cl. under a belljar for several days. The less stable glass shows a dull-dimmed surface. There is one other agent which gradually acts on glass, and that is exposure to strong light for a long time. The result is generally a change of colour, which may be brownish, or purplish, or yellowish; glass removed from old stained glass windows shows a deeper tint in those parts which have been protected from the action of light by the leading in which the glass was set, and the beauty of old stained glass may be due to the mellowing effect of light. If the glass plate of a strongly developed negative be cleaned, a decided trace of the former image is retained by the glass, and may reappear as a " ghost " if the same glass is sensitised and again exposed and developed. The best makers of plates recognise this, and do not re-coat plates that have been once used.

Just a word about the physical properties of glass. The use of glass in the glazing of large windows and skylights depends much upon the *strength* of the material, and this limits the size of plate that can be safely handled and installed. In some cases the mechanical strength of glass has to be specially relied on. Gauge-tubes of high-pressure boilers, porthole glasses in ships, the glass prisms inserted in pavement lights, glass bricks, champagne and mineral water bottles and syphons are examples of direct stress in glass. The tensile strength of glass is stated to vary from 1 to 6 tons per square inch, and the crushing strength from 3 to 8 tons. The chemical composition of glass appears to have a profound influence on the mechanical strength of glass. The hardness of glass may be increased by rapid cooling or quenching, but such glass is usually very brittle, particularly in oil.

The hardness and durability of glass is of importance in the case of such objects as plate glass windows, mirrors, spectacles and other lenses, which are exposed to handling and periodical cleaning.

Of some importance is the " thermal endurance " of glass, which measures the amount of sudden heating or cooling to which glass may be exposed without risk of fracture. The chimneys of lamps, gas burners, electric light bulbs, safety lamps, boiler gauge glasses, thermometers, laboratory vessels are all ex-

posed to sudden changes of temperature, and the value of such glasses depends on their power to undergo such treatment without breakage.

The expansive property of glass is also of importance, especially when glass is attached to metal. In certain incandescent lamps metallic wires are sealed into the glass bulbs, and the chief metal for this purpose (till recently) has been platinum, whose co-efficient of expansion is low compared with most metals, and whose freedom from oxidation at a high temperature makes it easy to produce a clean joint between glass and metal.

In the incandescent electric lamps, although the glass-metal joint must be quite air-tight, the two bodies are attached over a very short distance, but in wired glass an entire layer of wire netting is interposed between two layers of glass. Here the oxidation of the metal only gives rise to a few bubbles of no importance, but any difference of co-efficient of expansion may cause the wired glass to crack spontaneously during or after manufacture.

Thermal expansion is important also in connection with mercury thermometers, which have to be specially annealed before being graduated. It is a curious fact that glass containing *both* the alkalies (soda and potash) shows thermal effects more markedly than glass containing *one* of the alkalies only.

As regards electrical properties, the harder glasses, i.e. those richest in silica and lime, are the best insulators, while the softer glasses, rich in lead or alkali, are the poorest insulators, particularly as these latter have the property of condensing moisture on their surfaces, so that the electricity leaks away along the film of moisture.

Although the *transparency* of glass is a special property of glass, yet no kind of glass is perfectly transparent, for a considerable portion of light is turned back by reflection at the surface of entry, and again by reflection at the surface of exit; also a certain proportion of light is absorbed during its passage through the glass.

Even the best glass will show the absorption of light; this may well be seen by looking at a sheet of glass edgeways, when a decided green tint of varying intensity will be seen. Special glass is used in photographic studios to absorb as small a proportion of the chemically active rays contained in daylight as possible. Glass which has been intentionally rendered absorbent for light of certain wave lengths is used for special purposes. Besides coloured glasses, other forms of glasses, especially " Crookes " glass, are used for spectacles which will protect the eye from the harmful effect of very short (ultra violet) and very long (infra red) light waves. This is especially important for furnace workers and for observers at sea or in aeroplanes. Another purpose of such tinted glass is to protect valuable objects such as

pictures and museum specimens from fading or deterioration, from exposure to strong light. Vita-glass, and Sana-lux glass are much used in hospitals for admitting violet rays: the composition is a trade secret, but I believe they contain an excess of silica.

The materials which go to form glass should be as pure as possible, and in a fine state of division, and as dry as possible. The materials of which glass is made are (i) silica, chiefly in the form of sand; (ii) alkalies (soda and potash) in the form of soda-ash or carbonate of soda, salt-cake or sulphate of soda, sodium-nitrate or nitre, pearl-ash or carbonate of potash, and sometimes saltpetre or potassium nitrate; (iii) other bases, such as barium oxide, lead-oxide and calcium oxide (lime), zinc oxide, aluminium oxide, manganese oxide.

The pots used in glass manufacture are of two kinds, the open and the closed. They vary in capacity from 2 cwt. to 3 tons. The open vessels are sometimes very large and are called "tanks." The fire-clay, of which these vessels are made, has to be carefully chosen and prepared. As the glass attacks these vessels, they have to be frequently renewed. They are also affected by the high temperature (1400° C. to 1600° C.) of the furnaces.

The pots have to be carefully heated to a red heat before the materials or "batch" to make glass are introduced. For making bottles and all kinds of sheet glass, large tanks are used. Where special qualities, or relatively smaller quantities of glass are required, pots are used. The materials to form glass have to be accurately weighed in proper proportion, and carefully mixed by hand or machinery. They are charged gradually into the tank or pot at intervals of half an hour or longer, because much foaming takes place, and the raw materials occupy more space than the glass formed from them. As many as 4 to 8 "fillings" are usually required. When melting is complete we find a transparent mass of glass containing a quantity of bubbles. To get rid of these, the molten glass is heated more intensely to allow the bubbles to rise to the surface and escape. To get rid of the minute bubbles a potato is placed in the crook of a forked iron rod and dipped into the molten glass. The heat drives off the water and decomposes the potato, and a violent boiling takes place. This carries off the fine bubbles and mixes the molten glass very thoroughly. A sample of the glass is then taken out and examined carefully, to see if it is "fine," and free from bubbles.

There are three ways of removing the molten glass from the furnace—1, ladling; 2, pouring; 3, gathering.

"Ladling" is the simplest, but a ladle cannot be used without contaminating the glass by oxide of iron and introducing bubbles of air, and if the ladle is cold it tends to chill the glass. For ladling, the glass requires to be kept at a higher temperature than usual, so as to be more fluid. This process is limited to the

production of the inferior kinds of glass. The better varieties depend on " gathering " or " pouring."

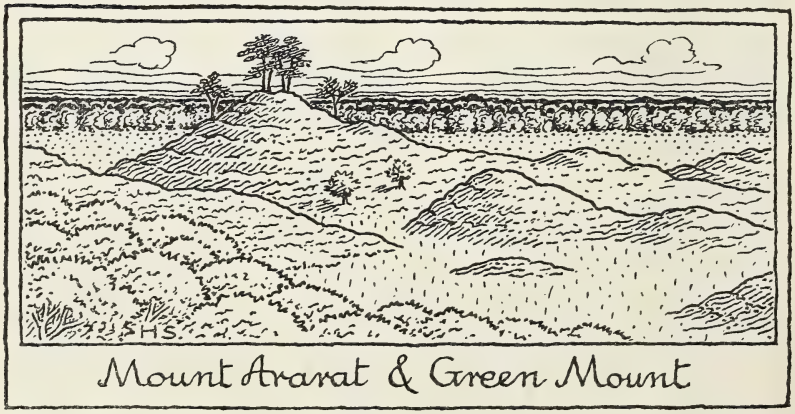
The great masses of glass required for the production of plate glass can only be handled by the method of " pouring." The pots are mechanically lifted out of the furnaces, and carried by overhead cranes to the place where the glass is to be formed into a plate. There the pot is tilted and the molten glass poured out on to a table, where a great roller rolls the pool of glass into a sheet much as dough is rolled out with a rolling pin.

" Gathering " is limited to the quantity that can be dealt with in one piece, though it is wonderful how much can be " gathered " on a single pipe by a skilled workman.

The process of " gathering " consists in dipping a heated iron rod or tube into the molten glass. This is repeated until the desired quantity is attached to the rod or tube. A hollow sphere is then formed by blowing into the tube. Different articles are then evolved from this sphere by a series of different manipulations. Of course the pressure available by human breath is very limited, so in blowing large articles compressed air is used. Bottles, lamp chimneys, electric light bulbs are blown into moulds. Bottles especially are made by machines, which can turn out a million in a week.

"Natural Landmarks in Bournemouth and New Forest Districts."

By Heywood Sumner, F.S.A.



We are the Historical and Archæological section of the Bournemouth Natural Science Society, and confession must be made at the outset of this paper that it contains no positive information as to either History or Archæology. I hope however

that it will be found to contain some Natural Science and Topographical observation that may help Archæological students in a negative manner—thus—by telling them how *not* to interpret the landmarks towards which I desire to call attention.

These Districts belong geologically to the Tertiary formation, and their surface and subsoil may be said generally to consist of gravel, sand, or clay, which are usually found in layers; but sand is also found in patches and pockets. Excepting gravel-stones which are mostly subangular flints, the only stone to be found here is sandstone, alias iron-stone, alias heathstone—i.e. sand, or sandy clay indurated by iron; and Burley rock—i.e. a conglomerate of gravel stones and sandy clay indurated by iron. Sandstone is found in patches and pockets, Burley rock in layers—and the latter may be dismissed as it does not concern my present enquiry—but sandstone does, for its gradual concretionary formation has, during the lapse of countless centuries, helped to retard sub-aerial denudation of the underlying subsoil. Clay wastes more rapidly than sand beneath rainfall; and where, in process of surface denudation, a sand pocket may be uncovered surrounded by sandy clay, or clay, such surrounding soil wastes, leaving the sand pocket as a mound which gradually tends to assume a conical form above the surrounding area of wasted clay—a result that has been emphasised if such sand is capped with protecting sandstone.

Such sub-aerial land-marking has been in process—here, rapidly—there, slowly—everywhere unceasingly during the aeons of geologic period that have elapsed since the Tertiary sea, or lagune water, ebbed, and the subjacent floor emerged as dry land. Accordingly, on such soil we find sandy hillocks of which the formation is due to the causes mentioned above. There are many of such within the districts of my title, and they are worthy of investigation, for they have so frequently been supposed to have been raised by the hand of man, and are sometimes given *Barrow* place-name suffixes.

Not one of the hillocks subsequently described has been proved by excavation to be a barrow. Such attribution was probably suggested by their conical profiles, and by hole-diggings on their summits—which certainly indicate search for something desired beneath the top-surface, but this something was not burial treasure, it was sandstone, slabs and nodules of which are scattered on the fossicked summits of several of these landmarks.

Hillocks that rise on Tertiary soil have not received much notice from topographical observers, but the following extract from Cobbett's "Rural Rides," vol. 1. p. 263 (for which I am indebted to Mr. R. K. Cardew), shows his curiosity as to their formation: "At Churt" (in Surrey Tertiary formation) "I had, "upon my left, three hills out upon the common called the "*Devil's Jumps*. The Unitarians will not believe in the Trinity, "because they cannot account for it. Will they come here to "Churt, go and look at these *Devil's Jumps,* and account to me

" for the placing of those three hills, in the shape of three rather " squat sugar-loaves, along in a line upon this heath, or the " placing of a rock-stone upon the top of one of them as big as a " church tower. For my part I cannot account for this placing " of these hills. That they should be formed by mere chance is " hardly to be believed. How could waters rolling about have " formed such hills? How could such hills have bubbled up " from beneath?"—N.B. The " rock-stone upon the top of one " of them," suggests comparison with the " Agglestone " mount, near Studland, a similar, natural denuded hillock, protected atop by a huge lump of concretionary sandstone.

But William Cobbett, though curious as to the above, was a hater (he either hated or loved) of heathland. When he traversed the New Forest in his " Rural Rides " he writes—" the intoler- " able heath "—" a poorer spot than this New Forest there is " not in all England."

And William Gilpin in his picturesque survey of our Districts regarded moorland with scant appreciation. He describes such land as—" naked "—" these tracts of heathy country are often " larger than picturesque beauty requires "—" from Winborne " we passed through a heathy, barren, flat unpleasant country to " Pool."

Both these constant landscape lovers maligned heathland. They did not recognise its sombre emanation of repose, and endur- ance throughout the ages. In shaggy mouse-coloured vesture of winter and spring; relieved by fragrant yellow furze bloom in May; then by green acres of bracken, and of ruddy acres of heath bloom in summer; followed by gold and russet wilting of fern, and heath bells in autumn. To look on heathlands with aversion, is to mis-regard them—to fail in understanding.

In the opening chapter of " The Return of the Native " (to Egdon Heath), Thomas Hardy thus reveals the abiding spirit and secret of heathland—" to know that everything around and " underneath had been from prehistoric times as unaltered as the " stars overhead, gave ballast to the mind adrift on change, and " harassed by the irrepressible New. The great inviolate place " had an ancient permanence which the sea cannot claim. Who " can say of a particular sea that it is old? Distilled by the sun, " kneaded by the moon, it is renewed in a year, in a day, or in " an hour. The sea changed, the fields changed, the rivers, the " villages, and the people changed, yet Egdon remained. These " surfaces were neither so steep as to be destructible by weather, " nor so flat as to be the victims of floods and deposits—even the " trifling irregularities were not caused by pick-axe, plough, or " spade, but remained as the very finger-touches of the last " geological change." It is to such inviolate places that I wish to direct your attention, and to arouse your curiosity as to hillocks on virgin soil that have been formed by denudation

beneath the elements—" the very finger-touches of the last " geological change."

Heath, furze and fern clothe the hills and plains of such primeval wastes; scattered thickets of self-sown oak, ash, alder, sallow and crab-apple grow in sheltered bottoms, present-day examples of wild forest tree growth in the past; but signs of bye-gone cultivation, lynchets, or rectangular field marks, will be looked for in vain. Signs of prehistoric and medieval human activities may be found here and there within these Districts—such as barrows, small British camps of defence, pastoral enclosures, Roman pottery kiln sites, medieval deer-parks, pig-pounds, vaccary and coppice banks, while latter-day activities include bee-gardens, tree-planting and inclosing, gravel and sand diggings, turf cutting, and road making. Excepting the above (that relatively to the whole area amount to little), the heathland of these Districts may be regarded as virgin soil. It has never been cultivated, as so much of our present downland has been in prehistoric and subsequent times.

The foregoing explanatory notes are given as introduction to the following topographical survey of hillocks that rise on moorland wastes in our Districts.

ST. CATHERINE'S HILL is capped by a sheet of plateau gravel, lying on Bracklesham Beds. Several hillocks may be seen beside St. Catherine's Hill and Ramsdown, if the sandy track spotted with sandstone be followed by way of Mill Plain to Hurn Station; along the East base of St. Catherine's Hill these occur as terminals to buttress-like projections from the hill-scarps. The measurements of one may be taken as typical. It rises on the East side 28 feet 6 inches in 48 paces up; about the same on the North and South sides; on the West side it rises, from a spur ridge that projects and descends from the hill-scarp, 7 feet in 15 paces up; the top is about 4 paces across, with peaty sand floor.

BLACKWATER FIRS stand on the West base of St. Catherine's Hill; here, beside the road from Christchurch to Hurn, rises an isolated conical hillock, marked *Tumulus* in the 6-inch O.S. sheet. It is covered by rhododendron undergrowth, above which fine Scots and Austrian pines form an overhead canopy. There is no ditch around the base of this hillock. It rises 37 feet in 46 paces up; the top is 3 paces across East to West, from North to South it slopes gently upward for 3 paces and downward for 8 paces, the floor is sandy, covered with pine roots and needles. I think that this hillock is of natural formation.

On the East side of the railway from Christchurch to Ringwood, three quarters of a mile South of Avon Castle, there lies beside WATTON FORD a stretch of heathland on Bracklesham Beds whereon rises a curious group of cushion-topped mounds—some large—some small—some scattered—some aligned in

switch-back rise and fall; they are surrounded by boggy soil, rabbits work freely in these mounds and their scrapes reveal pure, whitish sand as the subsoil. This group shows good examples of sand landmarks naturally formed by denudation beneath the elements.

MOUNT ARARAT AND GREEN MOUNT. Boveridge Heath (near Verwood) whereon rises Mount Ararat, has recently been inclosed, and planted with conifers by the Forestry Commission. In order to prepare this waste for planting, furze and heath have been burnt, and drain ditches dug down Wild Church Bottom—with result that Mount Ararat is now of comparatively easy access on foot. The soil is Bagshot Beds, sand, clay and gravel, and the Mount stands about 250 feet above the sea, surrounded by hummocks and hollows on the North, East and South sides, from which its final rise is about 35 feet in 50 paces up, while on the West side it falls continuously and abruptly for about 70 feet to Wild Church Bottom. Its top is a bare flat of sandy clay, 10 paces across in rough circle, strewn with sandstone—lumps of which outcrop on the summit footpaths, and four old Austrian pines crown this landmark that stands for Dorset—near the Hants and Dorset boundary.

The West hillside of Mount Ararat should be descended to the boggy level of Wild Church Bottom, where, looking South, a most arresting view may be obtained of GREEN MOUNT. From here it appears as an abrupt cone—but further survey shews that Green Mount is the terminal of a ridge rising from South to North. It rises on the East, North and West sides about 52 feet in 70 paces up. The top is now (after burning) clearly seen, dinted with numerous hollows, apparently diggings for sandstone. Exploratory digging, 2 feet down, in one of these hollows, yielded undisturbed sandy soil and sandstone. The Green Mount name is local, suggested by the fern growth on the newly upturned earth of these top hollow diggings, that contrasts with the surrounding heath-clad hills.

KING BARROW, near Cripplestile, is a landmark visible from afar, and stands about 300 feet above the sea, 150 paces South of the Fordingbridge-Cranborne road. *King*, may denote pre-eminence—which it has, *Barrow*, supposed resemblance to a burial mound—which it has not. The soil is Bagshot Beds, and the mount rises on the North-East side, 33 feet in 80 paces up, and on the South-West side, 51 feet in 101 paces up. It is surrounded by hummocks and hollows and moorland growth. The top is flat, grass-grown, undisturbed by diggings—excepting a central post-hole which probably marks bonfire rejoicings—and measures 17 paces from North-East to South-West, and 10 paces from North-West to South-East. The paths up the mount reveal the subsoil—sand, gravel, and sandy clay, washed and pitted by rain-water runnels. Below King Barrow, amid heathland towards the South, there rises a lesser mound of similar natural formation.

BLACK BARROW stands on forest moorland bordering the South-Eastern side of Dockens Water. The soil is Bracklesham Beds. This hillock is oval in shape, with long axis from East to West, and it is the Eastern terminal of a sandy ridge that gradually rises from the West; its vegetation differs from that of its peaty surroundings, if such growth dividing-line be taken as the base of the hillock, it rises about 28 feet in 70 paces up. The top is pitted by random diggings, the purpose of which is not apparent. Rabbit burrows abound shewing the subsoil to be white sand. All the terrain indications on and around this hillock signify that it has been denuded by natural, elemental agency.

FIR POUND, Ogden's Purlieu, stands beside a bog bordering the North-Western side of Dockens Water, about 200 yards from Black Barrow, and is on similar soil. Prior to 1789 an oval inclosure was made here that measures 460 paces around, and is bounded by an outside ditch and an inside bank. Fir Pound hillock stands on the North-West boundary of this inclosure. It rises about 18 feet in 40 paces up, the top has no sign of diggings, and measures 5 paces across. Rabbit burrows shew the subsoil to be white sand and pebble stones. Old, wizened Scots pine are scattered all over Fir Pound. This oval inclosure is shewn in the 1789 survey map of the New Forest, tree-planted. Scots pine were first planted in the New Forest at Ocknell clump in 1775, which suggests that the wizened pines in Fir Pound may date back to about that period. I do not think that the hand of man has been concerned in the formation of this hillock.

A nameless mount in OGDENS PURLIEU dominates and terminates an isolated ridge on the North-West of Fir Pound bog. The soil is Bracklesham Beds. On the East and West sides it rises 44 feet in 108 paces up, on the South side its slope is long and gradual, on the North side it rises 11 feet in 21 paces up, and the base level of such rise continues Northward as a ridge, pitted and littered with diggings for sandstone for about 200 paces, then falling towards the North. The top of the mount is 6 paces across, and scattered sandstones lie on the surface, bearing witness to sandstone capping that fortifies this ridge. Rabbit scrapes on the mount sides reveal white sand.

SLODEN HILL. On the South-East margin of Old Sloden Wood an eminent hillock stands on the moorland that slopes down to Dockens Water. The soil is Bracklesham Beds. It rises on the East and West sides about 56 feet in 101 paces up, on the North side 36 feet in 48 paces up, on the South side its slope is long and gradual. The top is much riddled by hole diggings and hummocks of upturn, caused by rabbit extermination; measurement is thereby prevented. The said upturn shows white sand mingled with sandstone as the subsoil. Following the hillside towards the East, there rises another—but lower—hillock, which, like the above, is connected with Sloden Hill by a rise.

Both compare in position with the hillocks that project from the East side of St. Catherine's Hill (supra).

BROWN LOAF, Crane's Moor, Burley, stands on the North side of the railway from Ringwood to Brockenhurst. The soil is Bagshot Beds. Approached from the North, " Brown Loaf " appears to be a conical hillock, and rises 39 feet in 65 paces up; when the top is reached, it will be found that this hillock—like Green Mount and Black Barrow (supra)—is the terminal of a ridge, about 20 paces in length from North to South, then falling 18 feet in 30 paces to the edge of the railway cutting, the North scarp of which is covered here with slabs and nodules of brown sandstone, testifying the sandstone capping that fortifies this ridge. The prefix *Brown* may apply to contrast in colour of material found in this hillock, and the adjacent white sand-pits, and the suffix *Loaf*, to the sugar-loaf profile of this hillock as seen on the North side.

PEAL HILL rises on moorland, East of the Southern Railway, and about half a mile from Decoy Pond Farm. The soil is Barton sand. This hill is included in my list only as an example of false attribution to a natural eminence—that it was the site of a *Peel,* (North country = small castle) cf. " Partinopex de Blois," by William Stewart Rose, 1807, note p. 203, a wholly misleading attribution. On the North, South and West sides it rises about 36 feet in 90 paces up, on the East side 25 feet in 60 paces up. Its top is flat and oval, 104 paces North to South, 50 paces East to West. The subsoil of the top is sandy peat and gravel. This hill is natural, and is a large example of an isolated eminence produced by denudation beneath the elements.

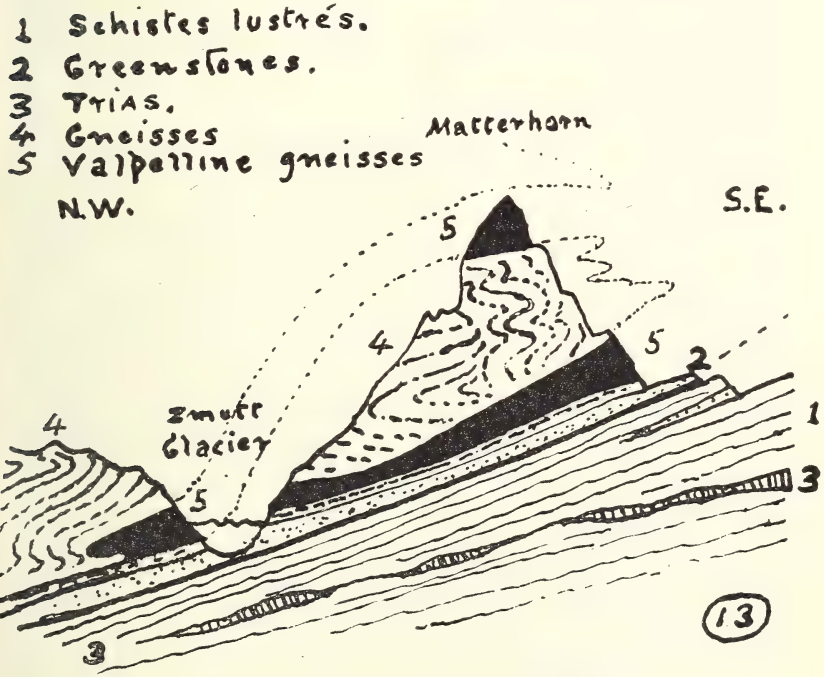
BARNEY BARNS HILL stands in Dibden Bottom, 150 paces South of the road from Hythe to Beaulieu Road Station. The soil is Barton sand, and the hill rises from boggy moorland, gradually, with long axis from East to West, but more abruptly on the North and South sides which measure about 30 feet in 70 paces up. The top is entirely overgrown, and the humps and hollows that cover the floor are thereby concealed. The subsoil appears to be peaty sand. The base of this hill may approximately be regarded as an oval of 390 paces. J. R. Wise in " The New Forest," p. 197, refers to Barney Barns Hill as " apparently of sepulchral character." I do not agree with his estimate, but consider that it is a denuded sand hillock.

This ends my survey of Natural Landmarks in Bournemouth and New Forest Districts, which have frequently been attributed to the hand of man. If, as I hope, some of our members may desire to follow my direction, they will not be disappointed. A few of these sites may be approached by car or cycle, but most may not. In the latter instances the pilgrim's progress must be made afoot; over hills—but not of *Difficulty;* and sloughs—but

not of *Despond;* and the lure of direction given above may be trusted; it will lead to visions of wild undisturbed beauty, amid regions of solitude and silence, haunted by terrain antiquity, remote from the hoot and roar of present-day road racket, and the pilgrim—thus guided, will arive at hillocks, some of *Error* (in attribution), but all of *Remembrance,* and may espy *Paradise* in the far blue distance.

"Geology of the Alps."

By E. St. John Burton, F.L.S., F.G.S., F.Z.S.



To illustrate in-folding of the Alpine type.

During the Tertiary era, in Miocene times, colossal foldings of the crust of the earth took place. With respect to the Alps, these were the outcome of a series of movements originating in far more remote periods. Although there are few traces of important volcanic action in the Alps, initiatory foldings along the lines of the Alps as we see them to-day began probably as early as pre-Cambrian times,* obviously a very long time ago, if we consider what the age of such rocks as pre-Cambrian must represent; evidently such a vast lapse of geologic time, that a computa-

* Geikie. "Text Book of Geology." Vol. 2. p. 1373.

tion of it by actual figures is perhaps best not attempted, because the calculation might run into hundreds of millions; and again, any theory respecting the age of the earth's formation, which demands a time-limit for all observed phenomena, is almost certainly open to question, if not to grave doubt, and one may quote the now general abandonment of Lord Kelvin's views concerning the age of the earth (20,000,000 years) as an example of how scientific opinions change in the course of a few years.

The early pioneers of geology, when they witnessed the jagged and formidable peaks and serrated ridges of the Aiguilles, imagined that a vast and sudden convulsion of nature's forces had elevated in tangled disarray the dissected pinnacles of the Alps; but we now know that such forms were produced by granitic intrusions into a sedimentary cover, and that the Aiguilles emerged, simply because this cover was, in the course of long ages, worn away.

There are four different types of mountain-folding in the world. The " Alpine " type, consisting of combined inward dip and inversion, with considerable overthrusting, most directly concerns us in the present account. Now, as the " Alpine " type is represented on the Dorset coast, I shall occasionally make a few comparisons between that locality and the Alps. First of all, the origin of the Alps needs consideration. J. Hall, in 1859, pointed out that thick sedimentation and mountain-chains were inseparably connected. Owing to sedimentation, a subsidence of the sea-floor occurs, and a depression is formed.

J. D. Dana, in 1873, gave the name of Geosyncline to the depression in which thick sedimentation occurs, but he considered the formation of the depression as a product of lateral compression.

According to Argand, a geosyncline is a long marine depression which may be the result of squeezing or of stretch.* Thus, two classes or phases of work are accomplished by the forces of nature towards the building of mountain-chains :—

1. Sedimentary (or accumulation of sub-aqueous material).
2. Orogenetic (or arising from within).

E. Haug, following Dana's conception, worked out geosynclinals and geanticlinals as applicable to mountain-chains such as the Alps, and this method is one of the basal conceptions of modern tectonics (or structure) and, for the Alps, the basal conception.* According to Argand, we may term Europe the Foreland, and Africa the Hinterland. Paul Termier compared the Foreland and the Hinterland of the geosyncline to the jaws of a big vice. In his opinion the southern jaw approached the northern one. The intervening geosyncline was thus compressed and folds originated. The southern jaw even over-rode the northern, and the folds formed of the geosyncline were thrust against the Foreland (Eurasia).

* L. W. Collet. " The Structure of the Alps " (1927), pp. 6-7.
* Op. cit. p. 7.

These folds, according to Termier, were the Alps.* So far, this does not present insuperable difficulties. Termier's conception of the push and folding, resulting from the compression of the geosyncline, is the best, as it appears the most simple method of explanation yet advanced. Still there remains the important question as to why these movements occurred, and finally attained so vast a development during the Tertiary Miocene period. It is true that in various parts of the world considerable oscillations of level have taken place since, including submergence, chiefly in Pliocene times, but since the last great Tertiary upheavals nothing has occurred at all suggestive of an early renewal of mountain-building on the scale of the Miocene uplift, although the Alps themselves yet remain in a state of instability along old lines of weakness, and perhaps before the senescent stages of denudation are completed, the range may once more be elevated and plicated with an equal degree of intensity to that of the already remote past.

This possible event would not occur within the next 30 million years. There is no need to discuss here the theory of Isostasy, which has been dealt with by several authors, but it may be recalled that Major Dutton (America) was the first to enunciate the principles of Isostasy. We will assume, for the sake of brevity, that the Alps originated through the agency of Isostasy, the cyclical events resulting as a direct consequence of radio-activity and isostatic re-adjustment of the earth's crust. The re-elevation of mountains long ago degraded may be shown by unconformity, the deposits forming the mountains not being in chronological sequence, nor of the same order of super-position, and probably separated by an immense interval of time. The Jura Mountains must be considered as part of the Alps, although of lesser elevation, and not so intensely folded in their structure. They lie between the Rhine and Rhône valleys, forming the Franco-Swiss frontier, and are composed of parallel ridges curving generally North-East and South-West, broken by numerous transverse and deep gorges. The Crêt de la Neige rises to 5,654 feet, the Chasseron to 5,286 feet, and the Dôle to 5,505 feet. The average height is between 2,000 and 3,000 feet. The Jura Mountains are part of the Western Alps, and consist principally of a succession of anticlines and synclines. The anticlines form ridges, and the synclines, valleys. This, although a simple enough arrangement, is the reverse of what usually results by erosion in such a case, when anticlinal structures, degraded, often form valleys, and synclinal structures, elevations, for the reason that an anticline is relatively weaker. The Jura Mountains are known, geologically, as virgations of the Alps, that is, a wing-like spread, caused by the advancing movement of the great upheaval—a tangential push.

The Grand Salève is a fine example of Jura folding, and its

* Collet, " The Structure of the Alps," p. 7.

geological structure that of an elongated anticline, in the middle of the Tertiary syncline separating the Alps from the Jura range. Le crêt (the crest) attains 4,530 feet in height, and the mountain is said to be still rising. This wonderful escarpment is strongly reminiscent of our familiar St. Aldhelm's Head, on the Dorset coast, but on a vaster scale, and strangely enough is composed, in part, of the same strata. Here also Portlandian and Purbeck Beds are seen above the well known Kimmeridgian, from which the continental equivalents take their name.

The vast slopes of the screes are likewise composed of the less resisting material, but at the Salève large erratic boulders of gneiss and granite are present, showing that in the great Ice-age, according to Riss, the top of the Grand Salève was entirely covered by glaciers.

I will not commit myself to the statement that St. Aldhelm's Head was ever covered by ice, although this is not so improbable as it might appear, because the high ground of the neighbourhood may well represent a peneplain, or land which has long undergone intense erosion, a fact that should not be overlooked in studying the geology of Dorset.

From the neighbourhood of Chamonix, we see the classic Mont Blanc, the loftiest peak of the Alps, 15,781 feet. The summit lies in French territory, so that Monte Rosa (15,217 feet) is the highest of the Swiss Alps.

The limit of the snow-line of Mont Blanc lies at 8,500 feet above sea-level. The immense cap of snow and ice on the summit gives almost a dome-like aspect to this. The valley of Chamonix has been carved through sedimentary strata—a zone of sediments—composed of Mesozoic, or Secondary rocks which may have constituted a marine trough. Mont Blanc itself is distinguished, geologically, as a granite batholith (a mass of stone of deep-seated origin). It is strange to reflect that this mountain was raised to so great a height by means of granite magma, the injection of which into sedimentary strata was accompanied by intense metamorphism, or alteration of the mineral character of the rocks affected. The intrusion of the Mont Blanc granite is only of Permian age (Permian = transitional, in part, from Palaeozoic to Mesozoic. The term " Permian " derived from Perm, in Russia); but the granite itself was coincident with an older range of mountains, Hercynian foldings, or Armorican flexures, of Carboniferous age (Upper Palaeozoic).

The extrusion or intrusion of granite magma created Mont Blanc.

The massif of the Aiguilles rouges is also granitic, and rises up beneath the Nappe de Morcles on the north-west of the Vale of Chamonix, and, according to Collet, is of older date than that of Mont Blanc, and separated from it by the Vale of Chamonix.

The chain of the Aiguilles is formed of granitic intrusions belonging to the Mont Blanc massif. These have not been raised

into sharp pinnacles exposed as we now see them, but have been laid bare through erosion of the sedimentary cover which originally concealed them, the rest has been accomplished by the familiar agents of denudation.

The highest points are :—Aiguille verte, 13,540 feet; Aiguille d'Argentière, 12,820 feet; Aiguille du Midi, 12,608 feet; and Aiguille du Dru, 12,320 feet.

Proceeding in the Bernese Oberland, we find further instructive examples of mountain-building, notably the Jungfrau and the Mönch, not forgetting that beautiful mountain, the Wetterhorn, near Grindelwald. The Jungfrau is composed of red granulated gneiss in its upper part, from the Silberhorn (at 3,705 metres), the façade of which is in Upper Jurassic rocks, so familiar on the coast of Dorset.

The height of the Jungfrau is 13,670 feet. Thus an enormous cap of gneiss is observed resting on Secondary (Jurassic) rocks. Gneiss, like granite, is composed of quartz, mica, and felspar, but it is foliated, and granite is not commonly so.

The Mönch Cliff, seen from the Jungfraujoch, presents an astonishing spectacle. The summit is of red gneiss, as on the Jungfrau's summit, and the lower part is of Crystalline and Sedimentary rocks, forced upwards and inwards under enormous pressure. Tertiary nummulitic limestones are intercalated between two sheets of Cretaceous age (Hauterivian). The height of the Mönch is about 13,460 feet. Below is that marvellous Glacial Trough, the Valley of Lauterbrunnen.

The Finsteraarhorn (14,025 feet) lies about $7\frac{1}{2}$ miles east of the Jungfrau, and is carved out of granite, known as Aar granite.

From Grindelwald, the beautiful Wetterhorn is well seen when the clouds do not obscure it, which they do quite often enough. The height of this is 12,166 feet. The attractive form of the mountain is entirely dependent on its geological structure. The Wetterhorn, and the Eiger (13,042 feet), which adjoins the Mönch, have been carved out of Upper Jurassic rocks no older than those at Kimmeridge Bay and Gad Cliff in Dorset. They also include Wealden and Tertiary strata, but with some differences in lithic character to those in England.

The structure of the Wetterhorn is that of a recumbent syncline, the core lying near Hohturnen.* The outlines of the mountain are cut across the folds of a syncline, thus producing that angular effect so much admired. The whole mass seems to lean towards the valley, a result produced by back-folding. It may be said that synclines form an important part of Alpine structure.

Across the Rhône and leaving the Bernese Alps, we approach the Pennine Alps, built up of an immense recumbent fold, within

* Collet, "The Structure of the Alps," p. 111.

which rocks of various ages have been welded together and contorted in a most remarkable manner.

Before describing the geology of the Matterhorn, in the direction of Monte Rosa (composed of Palaeozoic and Mesozoic rocks), two mountains near the Lake of Lucerne may be mentioned: the Righi (5,906 feet) and Pilatus (6,996 feet). The Righi is built up in great part of Oligocene Beds, which we have in the Isle of Wight and at Hordle Cliff in Hampshire. Pilatus is made up of Secondary and Tertiary folded beds. This serves to show that our Eocene and Oligocene Beds are well represented in the Alps, but there they attain enormous thickness—the Eocene 4,000 feet, and the Oligocene, 2,000 feet or more. The Oligocene, in England, is confined to the Isle of Wight and Hampshire, excepting the Bovey Tracy deposits in Devon, the entire formation reaching about 700 to 800 feet, which is not an insignificant total for what must be local deposits.

I now pass to the Matterhorn, that pyramid of sinister memory, rising to 14,782 feet. The Matterhorn is built up as a segment of a recumbent syncline, the intervening parts between the highest peak and the Zmutt Glacier having long ago been removed by the colossal effects of denudation. Thus we shall expect to find the same rocks at the summit, as across the depression between, and such is the case. The cap, then, of the Matterhorn is composed of Valpelline gneiss, and the lower precipitous slopes of Arolla gneiss. It is not necessary to explain these terms, " Valpelline " and " Arolla." Derived from local sources they do not immediately concern us, but geologically, the Valpelline series is the older, and the Arolla series the younger. Both are altered, or metamorphic rocks—marbles and granites being present—and the whole mass rests on the " shining " schists, or *schistes lustrés*, of Jurassic age, the mass not penetrating these, but floating upon them!

The pyramidal aspect of the Matterhorn must in time be eliminated, because the component material, however hard, is worn down by weathering, and the mountain must in the end lose its prominence.

The Valpelline older rocks may be relatively harder than the Arolla just here, but as the formations are reversed in the structure of the Matterhorn, the Valpelline, being on top, bears the brunt of the denudation, and will go first. Professor Tyndall has suggested that the Matterhorn must inevitably sink down by its own weight in consequence of the physical constitution of matter. In any case, we are forced to conclude that this mighty cone is merely a relic of denudation, and formed by the colossal movements of orogenic upheaval. The schistose nature of much of the rock causes it to break up through the action of frost and changes in temperature, and the loosened material is showered down in an endless rain of fragments.

Before concluding, a brief reference must be made to the

great Alpine nappes or " coverlets " of the Alps. These nappes were formed by backfolding on an enormous scale; only a relatively insignificant portion of the folds is sometimes preserved. The nappes (French = a " cloth, or cover ") are generally recumbent anticlines, the reversed limbs of which have partly disappeared owing to stretching (Haug). There are miniature recumbent anticlines at Lulworth in Dorset, which are equally instructive for geological purposes, and probably of the same age.

Last of all, the Klippen (outliers) may receive a short notice. A Klippe—as it is called by Swiss geologists—is an outlying portion of a formation. At Headon Hill (396 feet) in the Isle of Wight, there is an outlier of Plateau Gravel, of Pleistocene or Pliocene age, cut off by a deep valley in the rear, and by the Solent on the north, and resting upon older (Oligocene) sedimentary strata. The Klippen are, however, resting upon newer formations. At Brunnen, Lake of Lucerne, there are remarkable examples of striking and beautiful form, known as the Gross Mythen and the Klein Mythen. The height of these is 1,902 and 1,815 metres respectively. They are composed of Upper Cretaceous and Jurassic strata, upon Tertiary conglomerates. Outliers, from the nature of their position, must be considered as relics of denudation. The Swiss outliers, again, differ from superficial deposits like that on Headon Hill by the fact of their being evidently travelled masses, preserved in synclinal troughs. It has been suggested that the Klippen may have originally formed islands, but we have certainly no conclusive evidence of this. In any case, they constitute a wonderful background to a scene of inexpressible grandeur and magnificence.

Caradoc and Severn Valley Field Club.

The visit of this Club to Bournemouth, after an interval of 22 years, was made the occasion of a Lecture at No. 39 by Dr. Penrose, on June 11th, on the Bird Life of the district within a radius of 15 miles from Bournemouth, embracing the harbours of Poole and Christchurch with their four contributory river valleys, the cliffs of Dorset, the western end of the Isle of Wight, and the mud flats in and around the two harbours, besides the inland regions of open common and heathland, forest and woodland, and, in the north, the edge of the chalk downs. Particular reference was made to birds not usually seen in the district of the visiting club.

The Dartford Warbler is not uncommon, though reduced in number by the recent severe winter. The Stone Curlew is found, especially on the downs. Ravens still nest on the cliffs of the Island and along the Purbeck coast; a year or two ago a pair built in a fir-tree near Bovington Camp.

Peregrines still haunt the Purbeck Cliffs, to the detriment of pigeons homing from France and elsewhere. Montagu's harriers, oyster catchers and hobbies are not unknown, and the buzzard, though rare, may be found in the New Forest.

Teal, Widgeon, tufted duck and other water birds have not yet been scared from Littlesea by the traffic on the new motor road.

Terns of various species, notably the Little Tern, nest on the shingle between Milford and Hurst Point. Red geese and other wild fowl were driven in by the severe winter.

Rarities are Eider Duck, Long-tailed Duck, and Little Auk; scoters, divers, grebes, cormorants and guillemots are frequent, but unfortunately waste oil from steamers destroys many by fouling their plumage, and hampering their movements, with consequent starvation.

Reference was made to the heronry at Arne, in Poole harbour, which, with 45 or more nests, is considered to be the second largest in the country.

Obituary Notices.

Mr. Howard G. Lacey, B.A.

Howard G. Lacey was the third son of Mr. and Mrs. W. C. Lacey, of Wareham, Dorset. He had four brothers and one sister. The Laceys were of good old county stock, as is shown by the name of Kingston Lacey, the present home of the Bankes family, who migrated there after the destruction of Corfe Castle.

Dorset was a little known part of England before the writings of Thomas Hardy had achieved a world-wide reputation, though some notable Englishmen, like Nelson's Hardy, were men of Dorset, and more than a hundred years ago King George III. appreciated the charms of Weymouth. It was a wonderful country-side for a boy to grow up in, and amongst boys, both his own brothers and other lads, like the Pikes, one of whom, the late Tom Pike, a great sportsman and one of the most noted amateur punt-gunners of his day, was his special friend.

He roamed far and wide over Purbeck, East Dorset and West Hants, and as a youth and young man studied nature and learned the craft of outdoor sport.

It was during these early years that he was attracted to the studies which made him in later years so accomplished a field naturalist.

He was sent to school first to Charterhouse and thence to Sherborne. After leaving school he studied at Frankfurt for a time, and whilst there he took long walks into the Black Forest, where he became acquainted with several birds, especially the larger birds of prey like buzzards and kites, which, even in the seventies, had become very rare or extinct in this part of England. On returning to England he spent a short time with a " coach " at Bury St. Edmund's, and in 1875 he entered at Caius College, Cambridge, with the idea of preparing for one of the learned professions.

At College he took up athletics strenuously, especially cricket, in which he became so good that he almost won his " blue." In 1878 he took his B.A. degree.

For a short time there was some idea of his becoming a clergyman or a medical man, but the call of the wild was too strong. So early in the 'eighties he went to Texas, where he established himself on a ranch on Turtle Creek, Kerr County, about 10 miles from Kerrville. At first, as a pioneer, life was very hard, as his ranch was at the very edge of the settled lands; but he just loved it, and in time established a stud of polo ponies, herds of cattle and a flock of goats which achieved considerable reputation. He made several hunting trips with congenial companions like Judge West and Dr. Palmer and others into the

wild country towards the Mexican border. Ever after he spoke of these with enthusiasm. Both on these trips and at his ranch he observed and kept records, occasionally preserving specimens, some of which he sent for identification to the great American National Museum. The authorities soon realised his value and, as he kept open house at the ranch, naturalists and collectors from the eastern states used to come and stay with him, sometimes for weeks together. Occasionally such a man, who may have been a learned " closet " naturalist but inexperienced in the " field," would doubt a statement that such and such a bird was to be found near Kerrville, as its range, according to the books, was not so far west or south. Lacey would go out quietly, secure a specimen, and ask his guest to name it. If the latter was a " good sort " he would realise that Lacey was right; if on the other hand he was of inferior clay and unable to acknowledge his want of knowledge, he would invent some suppositious name for it and try and wriggle out in that way, but Lacey was a sound psychologist and quite able to appreciate a man's mentality at its true value. Yet withal he was a man of truest charity and able to forgive human failings. I have heard from one of his American friends that a man of his culture and refinement, far out in the country, constantly surprised them and sometimes—chatting over the fire at night—he would quote from the great poets and, as he had a splendid memory, could often supply the source of some quotation. As his friend said, " Fancy our going right out to Turtle Creek to hear good poetry !" So it was. He had had a good education, and though at school and college his time and thoughts seemed to be on athletics and sport, he took enough interest in his books to be able to make his learning of real use and happiness in after life.

So good an outdoor observer and field naturalist was he that the authorities at the American National Museum got him to send in reports and specimens; in consequence he sent in amongst many other specimens a mouse, hitherto believed to be undescribed, which was honoured with the specific name of **Peromyscus laceyi* (Allen and Bailey).

Life on a ranch entails much hard work and Howard, as he was always called out there, took his full share and, as so often happens to a man with an exceptional physique, at times overtaxed his strength. In 1919, owing to pain after exertion, he got a warning that was not to be ignored. He was advised to take life quietly; so he sold his ranch. Such distress was felt at the thought of his leaving, that an old friend with ample means—Mr. Shreiner—begged him to stay in the country, offering to finance him if he would only do so.

However, home called too strongly, especially as he realised that he was wanted to share his sister's home, and in 1919 he

* The American Museum of Natural History, November 8th, 1895.

settled down at Eden, 50 Wellington Road. He joined our Society in the same year, and very quickly was his worth appreciated. He was a man who, from boyhood, had accurate local knowledge, gathered in the district comprised in the map in our manual, that is, along the coast from Lymington on the east to Lulworth on the west, with some ten miles or so of the Hinterland. This includes the western half of the New Forest, inland beyond Fordingbridge, Cranborne and Blandford, and even beyond their limits. He had been a good shot, a keen fisherman and an even keener follower of hounds. As a young man he was in great request as a sportsman, and this enabled him to know the country as nobody other than a sportsman can do. With it he had a knowledge of field botany; he was a first rate ornithologist and had a good working knowledge of all classes of the vertebrata, of entomology, and indeed of every kind of living thing.

It is no wonder that he very soon was chosen by acclamation chairman—first of the Botanical Section in 1922, a position which he held for four years, and then of the Entomological Section, where he remained until the time of his death. In the summer expeditions he was the referee, and worthily succeeded Mr. Sherring, who had been formerly so successful a leader.

Not only did he serve our Society as Chairman of the Sections referred to. He was appealed to for lectures in other sections and especially the Zoological one. He took great trouble to get his facts accurate, and many of us well remember that, owing to his natural modesty and shyness, his opening sentences were halting, but as he warmed up to his subject, how interesting he was and how sorry we all were when he came to an end!

His work for the American Museum of Natural History had given him a practical insight into museum work. This was soon harnessed to the advantage of our Society. In 1923 he became honorary joint Curator of our Museum with the Rev. C. O. S. Hatton. He arranged the eggs of the birds on the British list from the Batley collection in wall cabinets which he helped to present to the Society, so that they could be seen properly. He arranged the mammalian skulls and had them properly labelled. Through his instrumentality several cases of stuffed birds were added to the collection and he had them all labelled correctly.

I think the above pricks out the manner of man he was. If the character of a gentleman can be summed up as that of a man who will not willingly hurt another person's feelings and is honest and upright in all his dealings, it describes him exactly. Physically he was an almost perfect type of the English country gentleman.

How deeply his loss was felt was shown by the large concourse of our members who were present at the funeral.

To testify to his love of birds, his sister has had erected to his memory a bird bath in the cemetery. Already it has been utilised to the full, and nothing would have pleased him more.

Mr. C. H. Blackett.

Mr. C. H. Blackett, who has been a member of the Society since 1908, was elected Honorary Auditor in 1918, and served the Society faithfully in that capacity until his death this year.

Mr. James Druitt, J.P.

Another octogenarian has passed away in the person of Mr. Druitt, who had been a member of our Society for five and twenty years. The history of his career is closely involved with that of the Borough, with which he had been connected in many capacities, as clerk of the old Board of Commissioners, and first Town Clerk of the Corporation, and afterwards as Councillor, Alderman, Mayor and Magistrate. He may well be described as one of the principal makers of Bournemouth, and to his zeal and foresight and legal acumen the town undoubtedly owes much of its prosperity. Of his numerous activities it is impossible to speak here at length, embracing as they did almost every phase of civic life. Of his personal character it would be difficult to speak in too glowing terms, of his courage, discretion, loyalty, impartiality and invariable courtesy.

Mr. A. W. Waters, F.L.S., F.G.S.

Arthur William Waters, who passed away at Bournemouth last February may be said to have discovered Davos. His indifferent health as a boy, followed by symptoms of tuberculosis, had led to residence abroad, where he studied at the Universities of Heidelberg, Zürich and Vienna. A chance summer visit to Davos in 1869 was found to be so beneficial that he decided to stay on for the winter, and he was thus the first Englishman to spend a winter in that now celebrated resort for the cure of tuberculosis, which then contained two hotels but no shops. In the following winter he returned with a cousin, and together they made the first skating rink in the valley, and Davos remained his headquarters for 35 years. There he worked up statistics for Sir Hermann Weber, the specialist on Climate, and, following the lure of Science, began to geologise and investigate the Tertiaries on both sides of the Alps, a pursuit which led to many adventures, for the Italian Government were suspicious of his geological hammer and survey maps on their frontiers, and more than once he was arrested as a spy.

As his Geological Collection increased in weight and bulk, he took it down the Rhine to England and presented it to the new Victoria University.

He next turned his attention to the study of Bryozoa (Polyzoa), minute creatures found in fresh and salt water, and also as fossils, believing that an improvement in the classification must come from a better knowledge of recent forms. He was always on the look out for fresh characteristics, and showed the importance of the opercula in determination, also of the oval and avicularia glands, of the ovicells, and of the form and position of the rosette plates and of the ancestrula. As his name became known as an authority on this group, specimens were sent to him from the Arctic, Antarctic, and Red Sea, as well as from the Challenger Expedition and elsewhere. These had to be examined microscopically, classified and named; slides and drawings—(he was a brilliant draughtsman)—were made of the various organs, and descriptive articles written for various scientific Societies of Great Britain. This work brought him into contact with all the Universities of Europe, as well as with the Laboratories of Naples and Villefranche and of Monaco whose ruler was himself devoted to scientific research.

During this period he identified himself with the local life of Davos, wrote several Papers on the resort, published some meteorological observations and, as a local authority, was in frequent correspondence with leading medical men. In 1905, when the climate of Davos had ceased to be congenial to him, he gave up his mountain home and came to Bournemouth, still a youngish man with many busy years before him. He at once joined our Society, in whose Proceedings for 1909 is recorded a Paper, read by him to the Zoological Section, on "The Structure of the Bryozoa." He continued his research until the age of 80, maintaining to the end that suitable work is the panacea for most infirmities. His collection of Bryozoa, consisting of some 35,000 microscopic slides, with all his drawings and writings, as well as his scientific library, passed into the keeping of Victoria University. His principal donation to our Society was a Collection of prehistoric remains from Lake-Dwellings in Switzerland.

Sir Edwin Ray Lankester, K.C.B., M.A., LL.D., F.R.S., F.L.S.

The death of Sir Ray Lankester removes a great figure from the world of Science, a physiologist of European reputation. It would be futile here to attempt a record of his distinguished career or of his numerous publications; sufficient that he conferred honour upon the Society by accepting the office of President, which he held in successive years 1911 to 1913, and that in November 1911 he delivered a Presidential Address on the subject "The Most Ancient Evidences of Man's Existence in Europe," of which a condensed report may be found in Vol. IV of our Proceedings.

Historical Lists of Officers of the Society.

COMPILED BY THE LATE MR. R. A. DE PAIVA.

Presidents

1903-4	J. E. BEALE (Mayor of Bournemouth).
1904-5—1905-6 ...	G. E. J. CRALLAN, M.A., M.B., M.R.C.S.
1906-7	H. J. WADDINGTON, F.L.S.
1907-8—1908-9 ...	A. RANSOME, M.A., M.D., F.R.C.P., F.R.S.
1909-10	DR. A. SMITH WOODWARD, F.R.S., F.L.S., F.G.S.
1910-11	DR. DUKINFIELD H. SCOTT, M.A., LL.D., F.R.S., F.L.S., F.G.S.
1911-12 — 1912-13	SIR E. RAY LANKESTER, K.C.B., M.A., LL.D., F.R.S., F.L.S.
1913-14 — 1914-15 —1915-16	SIR DANIEL MORRIS, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S
1916-17	THE RT. HON. THE EARL OF MALMESBURY, D.L., J.P.
1917-18	SIR JETHRO J. H. TEALL, M.A., D.SC., LL.D., F.R.S.
1918-19 — 1919-20	FIELD MARSHALL LORD GRENFELL OF KILVEY, G.C.B., G.C.M.G., LL.D., F.S.A.
1920-21	LT.-COL. SIR DAVID PRAIN, C.M.G., C.I.E., F.R.S.
1921-22 — 1922-23	F. G. PENROSE, M.D., F.R.C.P., F.Z.S., M.B.O.U.
1923-24	SIR F. W. KEEBLE, K.B.E., D.SC., F.R.S.
1924-25 — 1925-26	HUBERT PAINTER, B.SC., F.C.S.
1926-27 — 1927-28	HEYWOOD SUMNER, F.S.A.
1928-29	CLAUDE LYON.
1929-30	PROFESSOR F. O. BOWER, D.SC., F.R.S.

Vice-Presidents

1916-	H. BACKHOUSE, F.R.H.S.
1905-14	G. BROWNEN, F.C.S.
1906-	G. E. J. CRALLAN, M.A., M.B., M.R.C.S.
1921-25	FIELD MARSHALL LORD GRENFELL OF KILVEY, G.C.B., G.C.M.G., LL.D., F.S.A.
1904	E. HYLA GREVES, M.D., M.R.C.P.
1914-16	G. G. HAMILTON, F.R.C.S., F.R.H.S.
1910-12	C. J. HANKINSON, J.P.
1914-23	S. MCCALMONT HILL, D.C.L.
1905-20	J. E. LIDDIARD, F.R.G.S.
1904-28	REV. E. F. LINTON, M.A., F.L.S.
1918-28—29- ...	CLAUDE LYON
1916-	SIR DANIEL MORRIS, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S.
1912-22	W. T. ORD, F.G.S.
1916-24—1926 ...	HUBERT PAINTER, B.SC., F.C.S.
1916-21—1923- ...	F. G. PENROSE, M.A., M.D., F.R.C.P., F.Z.S., M.B.O.U.
1909-21	A. RANSOME, M.A., M.D., F.R.C.P., F.R.S.
1907-18	MISS C. AGNES ROOPER
1904-8	W. SAVILLE-KENT, F.L.S., F.Z.S., F.R.M.S.
1916-	R. VOWELL SHERRING, F.L.S.
1918-25	REV. H. SHAEN SOLLY, M.A.
1905-11	A. W. THOMAS, M.D.
1905-16	J. ROBERTS THOMSON, M.D., F.R.C.P., J.P.
1905-6 — 1907-14	H. J. WADDINGTON, F.L.S.
1928-	REV. C. O. S. HATTON, B.A., F.L.S.
1928-	HEYWOOD SUMNER, F.S.A.
1928-	HENRY BURY, M.A., F.L.S., F.G.S.
1929-	J. H. RALPH SMYTHE, J.P.

Chairmen of Committee

1904-5	J. ROBERTS THOMSON, M.D., F.R.C.P., J.P.
1905-6	J. E. LIDDIARD, F.R.G.S.
1906-7	H. J. WADDINGTON, F.L.S.
1907-10	W. T. ORD, F.G.S.

Chairmen of Council

1910-'11	W T. Ord, F.G.S.
1911-14	Sir Daniel Morris, K.C.M.G., J.P., M.A., D.Sc., D.C.L., F.L.S.
1914-Dec. 15 ...	G. G. Hamilton, M.A., F.R.C.S.
1916-17	Sir Daniel Morris, K.C.M.G., J.P., M.A., D.Sc., D.C.L., F.L.S.
1917-Feb. 19 ...	W. Munn Rankin, M.Sc., B.Sc.
1919-Mar. 20 ...	Sir Daniel Morris, K.C.M.G., J.P., M.A., D.Sc., D.C.L., F.L.S.
1920-22	Hubert Painter, B.Sc, F.C.S.
1922-27	J. H. Ralph Smythe, J.P.
1927-	Rev. C. O. S. Hatton, B.A., F.L.S.

Deputy Chairmen of Council

1911-14	G. G. Hamilton, M.A., F.R.C.S.
1914-Feb. 16 ...	Henry Backhouse, F.R.H.S.
1916 Mar.-Nov. 16	R. O'B. Furlong, C.B., J.P., M.A.
1916 Dec.-17 ...	W. Munn Rankin, M.Sc., B.Sc.
1917-19	F. G. Penrose, M.D,, F.R.C.P., F.Z.S., M.B.O.U.
1919-20	Hubert Painter, B.Sc., F.C.S.
1920-22	J. H. Ralph Smythe, J.P.
1922-27	Rev. C. O. S. Hatton, B.A., F.L.S.
1927-28	J. H. Ralph Smythe, J.P.
1928	Claude Lyon
1929	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.

Hon. Treasurers

1904-8	A. D. George.
1908-	G. Brumell, A.R.I.B.A.

Hon. Secretaries

1904-7	Miss C. Agnes Rooper and J. R. L. Dixon, M.R.C.S., L.R.C.P.
1907-8	J. R. L. Dixon, M.R.C.S., L.R.C.P., and H. Backhouse, F.R.H.S.
1908-10	J. R. L. Dixon, M.R.C.S., L.R.C.P., and Col. E. E. Markwick, C.B., C.B.E., F.R.A.S.
1910 Sept.-Oct. ...	J. Donkin, F.R.I.B.A.
1910-11	H. Le Jeune.
1911 Nov.-Feb. 1912	Sir A. Brooke Pechell, bart., M.B.
1912 Apr.-Mar. 1914	T. Michell, M.I.C.E.
1914 Apr.-Oct. ...	R. A. de Paiva.
1914 Oct.-July 1917	R. A. de Paiva and T. Capper, M.A., B.Sc.,
1917 July-25 ...	R. A. de Paiva.
1925-26	R. A. de Paiva and Rev. A. G. Yates, M.A., R.N.,
1926-	Rev. A. G. Yates, M.A., R.N.

Hon. Assistant Secretaries

Apr. 1911-1912 ...	T. Michell, M.I.C.E.
May Mar. 1912-1914 ...	R. A. de Paiva.
1917-1918 ...	G. G. Grace, B.Sc., A.R.C.Sc., F.E.S.
1919-1920 ...	W. G. Boul, M.A., LL.D., D.C.L.
1920- ...	W. J. Woodhouse, A.C.P., M.I.H.

Hon. Financial Secretary

1905-8	J. H. Scott, M.E., M.I.M.C.E.

Assistant Secretary

1909-	J. F. Spencer.

Hon. Librarians

1908-1909 ...	A. Scott, B.A.
1909-1911 ...	F. I. Cooke.
1911-1912 ...	W. Munn Rankin, M.Sc., B.Sc.
1913-1919 ...	H. J. Ellis.
1919 Oct.-Mar. 1926	J. Omer Cooper, F.E.S.
1920 Mar.-Jan. 1921	Rev. C. O. S. Hatton, B.A., F.L.S.
1921 Jan.- ...	Claude Lyon.
1923-1929 ...	Miss A. G. Veale, Hon. Assistant Librarian.

Hon. Editors

1911-12	G. E. J. Crallan, M.A., M.B., M.R.C.S.
1912-20	Hubert Painter, B.Sc., F.C.S.
1920-25	F. B. Taylor, B.A.
1925-	J. R. White, M.A.

Hon. Curators

1917 Jan.-July 1921	W. G. Wallace.
1921-Dec. 1922 ...	No Curator.
1923 Jan.-Nov. ...	Rev. C. O. S. Hatton, B.A., F.L.S., and Howard Lacey, B.A.
1923 Dec.- ...	Rev. C. O. S. Hatton, B.A., F.L.S.

Chairmen of Sections.

Antiquarian

1904-7	A. W. Thomas, M.D., M.R.C.S.

Archæological and Historical

1907-8	A. W. Thomas, M.D., M.R.C.S.
1908-Feb. 14 ...	G. Brownen, F.C.S.
1914 May-Nov. ...	Rev. Canon T. E. Usherwood, M.A.
1914 Dec.-24 ...	Rev. H. Shaen Solly, M.A.
1924-26	Col. J. R. Dodd, M.D., F.R.C.S.
1926-	R. K. Cardew, B.A.

Deputy Chairmen

1922-24	Col. J. R. Dodd, M.D., F.R.C.S.
1925-26	R. K. Cardew, B.A.

Astronomical

1920-24	Col. E. E. Markwick, C.B., C.B.E., F.R.A.S.
1925-26	G. E. J. Crallan, M.A., M.B., M.R.C.S.
1928-29	L. B. Benny, M.A., B.Sc., F.R.A.S.
1929-	J. A. Formoy, F.R.A.S.

Deputy-Chairman

1927-28	L. B. Benny, M.A., B.Sc., F.R.A.S.

Mathematical

1921-22	W. H. Scott, M.A
1922-24	B. M. Peek, M.A., F.R.A.S.

Astronomical and Mathematical

1924-25	B. M. Peek, M.A., F.R.A.S.

Botanical

1904-5	Rev. E. F. Linton, M.A., F.L.S.
1905-7	J. F. Rayner, F.R.H.S.
1907-May 18 ...	Miss C. Agnes Rooper.
1918-22	Rev. C. O. S. Hatton, B.A., F.L.S.
1922-26	Howard Lacey, B.A.
1926-27	Rev. C. O. S. Hatton, B.A., F.L.S.
1927-	L. Beeching Hall, F.L.S.

Entomological

1914-15	R. Beck, F.E.S.
1915-Dec. 19 ...	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.
1920-Jan. 26 ...	J. Neale, B.A.
1926-29	Howard Lacey, B.A.
1929-	Alan Druitt, F.E.S.

Geographical

1908-10	J. E. Liddiard, F.R.G.S.
1910-11	A. Scott, B.A.
1911-16	G. de Castro, M.R.C.S.
1916-	Claude Lyon.

Geological

1904-5	Rev. G. D. Shenton, B.A.
1905-6	The Marquis de Trevelec.
1906-14	W. T. Ord, F.G.S.
1914-17	W. Munn Rankin, M.Sc., B.Sc.
1917-18	H. Kidner, F.G.S.
1918-20	W. Munn Rankin, M.Sc., B.Sc.
1920-23	W. J. Woodhouse, A.C.P., M.I.H.
1923-	Henry Bury, M.A., F.L.S., F.G.S.

Photographic

1905-8	Councillor R. Y. Banks.
1908-10	C J. Hankinson, J.P.
1910-12	E. W. Barlow, F.R.A.S.
1912-13	G. Brumell, A.R.I.B.A.
1913-14	No Chairman.
1914-16	R. Y. Banks.

Photographic and Record

1916-25	R. Y. Banks.
1925-	W. Dieselhorst, A.M.I.C.E.

Physical

1904-26	Hubert Painter, B.Sc., F.C.S.
1928-29	G. E. J. Crallan, M.A., M.B., M.R.C.S.
1929-	Miss Marcia Penrose, B.Sc.

Deputy Chairman

1926-28	G. E. J. Crallan, M.A., M.B., M.R.C.S.

Zoological

1904-8	G. E. J. Crallan, M.A., M.B., M.R.C.S.
1908-10	A. W. Thomas, M.D., M.R.C.S.
1913-14	W. Munn Rankin, M.Sc., B.Sc.
1922–	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.

Microscopical

1909 Mar.-10 ...	J. R. L. Dixon, M.R.C.S., L.R.C.P.
1913-14	H. B. Wells, F.R.M.S.
1922-	F. B. Taylor, B.A.

Zoological and Microscopical

1910-11	H. B. Wells, F.R.M.S.
	A. W. Thomas, M.D., M.R.C.S.
1911 Mar.-12 ...	G. E. J. Crallan, M.A., M.B., M.R.C.S.
1911-13	H. B. Wells, F.R.M.S.
1914-16	T. B. Goodall, F.R.C.V.S., F.L.S.
1916-22	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.

Elected and co-opted Members of Council.

Title changed from Committee in 1910.

Many of these also had seats on the Council ex-officio either before or after their election or co-option. Their names are marked*

1905-7	Atkins, Dr. F.
1906-7—1908- ...	*Backhouse, H., F.R.H.S.
1914-15	*Banks, R. Y.
1905-6	Bax, P. B. Ironside.
1904	Bond, Dr. Eleanor.
1919-20	Boul, Mrs.
1904-8	*Brownen, G., F.C.S.
1906-8	*Brumell, G., A.R.I.B.A.
1906-8	Buckland, Dr. Frank.
1921-22	Cardew, R. K., B.A.
1909-11	Chandler, S. Whitty, B.A.
1905-6	Clements, Lt.-Col. W. G.
1904	Clift, Dr.
1921-28	Curme, Mrs.
1905-10	Curtis, W. Parkinson, F.E.S
1923-26—1927- ...	*Dodd, Col. J. R., M.D., F.R.C.S.
1914-16	Druitt, J., J.P.
1916-17	Dyer, J. Herbert.
1919-25	*Ellis, H. J.
1910-	French, J. M.
1929-	Fryer, Miss C. H.
1914-17	Furlong, R. O'B., C.B., M.A.
1919-Aug. 21 ...	*George, A. D.
1904	Giles, Dr.
1904-6	*Goodall, T. B., F.R.C.V.S., F.L.S.
1918-20	Gosse, W., M.D., D.P.H.
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